Manual No. '10 • PAC - SM - 137

MHI

# SERVICE MANUAL

# HYPER INVERTER PACKAGED AIR-CONDITIONERS

(Split system, Air to air heat pump type)

**CEILING CASSETTE- 4 WAY COMPACT TYPE**

| Twin type | Triple type |
|---|---|
| FDTC71VNXPVD | FDTC140VNXTVD |
| 100VNXPVD | 140VSXTVD |
| 100VSXPVD | |
| 125VNXPVD | |
| 125VSXPVD | |

**DUCT CONNECTED-LOW / MIDDLE STATIC PRESSURE TYPE**

| Single type | Twin type | Triple type |
|---|---|---|
| FDUM71VNXVD | FDUM100VNXPVD | FDUM140VNXTVD |
| 100VNXVD | 100VSXPVD | 140VSXTVD |
| 100VSXVD | 125VNXPVD | |
| 125VNXVD | 125VSXPVD | |
| 125VSXVD | 140VNXPVD | |
| 140VNXVD | 140VSXPVD | |
| 140VSXVD | | |

**CEILING CASSETTE- 4 WAY TYPE**

| Single type | Twin type | Triple type |
|---|---|---|
| FDT71VNXVD | FDT71VNXPVD | FDT140VNXTVD |
| 100VNXVD | 100VNXPVD | 140VSXTVD |
| 100VSXVD | 100VSXPVD | |
| 125VNXVD | 125VNXPVD | |
| 125VSXVD | 125VSXPVD | |
| 140VNXVD | 140VNXPVD | |
| 140VSXVD | 140VSXPVD | |

**DUCT CONNECTED-HIGH STATIC PRESSURE TYPE**

| Single type |
|---|
| FDU71VNXVD |
| 100VNXVD |
| 100VSXVD |
| 125VNXVD |
| 125VSXVD |
| 140VNXVD |
| 140VSXVD |

**CEILING SUSPENDED TYPE**

| Single type | Twin type | Triple type |
|---|---|---|
| FDEN71VNXVD | FDEN71VNXPVD | FDEN140VNXTVD |
| 100VNXVD | 100VNXPVD | 140VSXTVD |
| 100VSXVD | 100VSXPVD | |
| 125VNXVD | 125VNXPVD | |
| 125VSXVD | 125VSXPVD | |
| 140VNXVD | 140VNXPVD | |
| 140VSXVD | 140VSXPVD | |

**WALL MOUNTED TYPE**

| Twin type | Triple type |
|---|---|
| SRK100VNXPZIX | SRK140VNXTZIX |
| 100VSXPZIX | 140VSXTZIX |
| 125VNXPZIX | |
| 125VSXPZIX | |

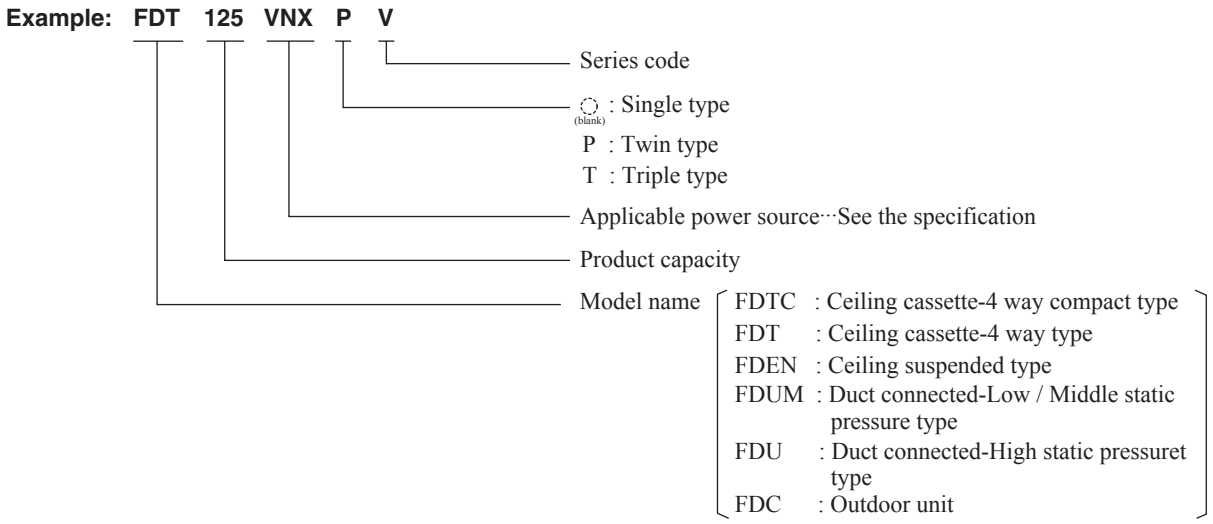
MITSUBISHI HEAVY INDUSTRIES, LTD.

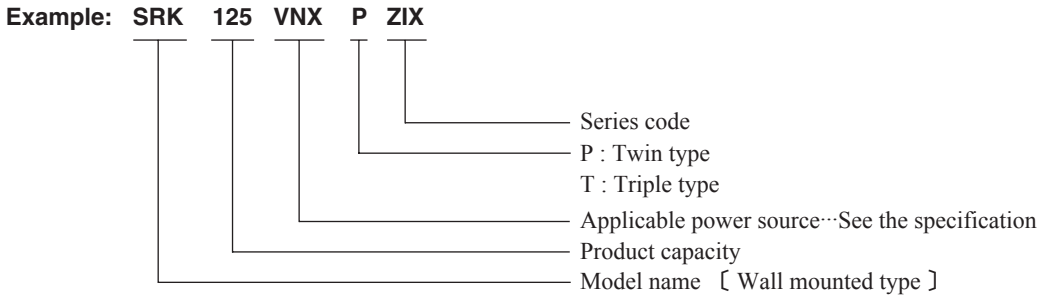
## CONTENTS

**1. OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER ..... 3**
**1.1 Remote controller ..... 3**
**1.2 Operation control function by the wired remote controller ..... 5**
**1.3 Operation control function by the indoor controller ..... 6**
(1) FDTC,FDT,FDEN,FDUM and FDU series ..... **6**
(2) SRK seies ..... **16**
**1.4 Operation control function by the outdoor controller ..... 20**
**2. MAINTENANCE DATA ..... 31**
**2.1 Diagnosing of microcomputer circuit ..... 31**
(1) Selfdiagnosis function ..... **31**
(2) Troubleshooting procedure ..... **34**
(3) Troubleshooting at the indoor unit ..... **34**
(4) Troubleshooting at the outdoor unit ..... **40**
(5) Check of anomalous operation data with the remote controller ..... **47**
(6) Inspection display of wireless specification model (FDEN,FDT) ..... **48**
(7) Power transistor module (including the driver PCB) inspection procedure ..... **49**
(8) Inverter checker for diagnosis of inverter output ..... **50**
(9) Outdoor unit controller failure diagnosis circuit diagram ..... **51**
**2.2 Troubleshooting flow ..... 54**
**3. ELECTRICAL WIRING .....101**
(1) Indoor units .....**101**
(2) Outdoor units .....**110**
**4. PIPING SYSTEM .....113**
**5. APPLICATION DATA .....116**
**5.1 Installation of indoor unit .....116**
(1) Ceiling cassette-4way compact type (FDTC) .....**116**
(2) Ceiling cassette-4way type (FDT) .....**122**
(3) Ceiling suspended type (FDEN) .....**128**
(4) Duct connected-Low / Middle static pressure type (FDUM) .....**132**
(5) Duct connected-High static pressure type (FDU) .....**136**
(6) Wall mounted type (SRK) .....**140**

**5.2 Instullation for wired remote controller .....144**
**5.3 Instullation of outdoor unit .....150**
(1) Model FDC71VNX .....**150**
(2) Models FDC100～140VNX, 100～140VSX .....**158**
**5.4 Electric wiring work installation .....166**

## How to read the model name


Example: FDT 125 VNX P V
Series code
◌ (blank) : Single type
P : Twin type
T : Triple type
Applicable power source···See the specification
Product capacity
Model name
FDTC : Ceiling cassette-4 way compact type
FDT : Ceiling cassette-4 way type
FDEN : Ceiling suspended type
FDUM : Duct connected-Low / Middle static pressure type
FDU : Duct connected-High static pressuret type
FDC : Outdoor unit


Example: SRK 125 VNX P ZIX
Series code
P : Twin type
T : Triple type
Applicable power source···See the specification
Product capacity
Model name 〔 Wall mounted type 〕

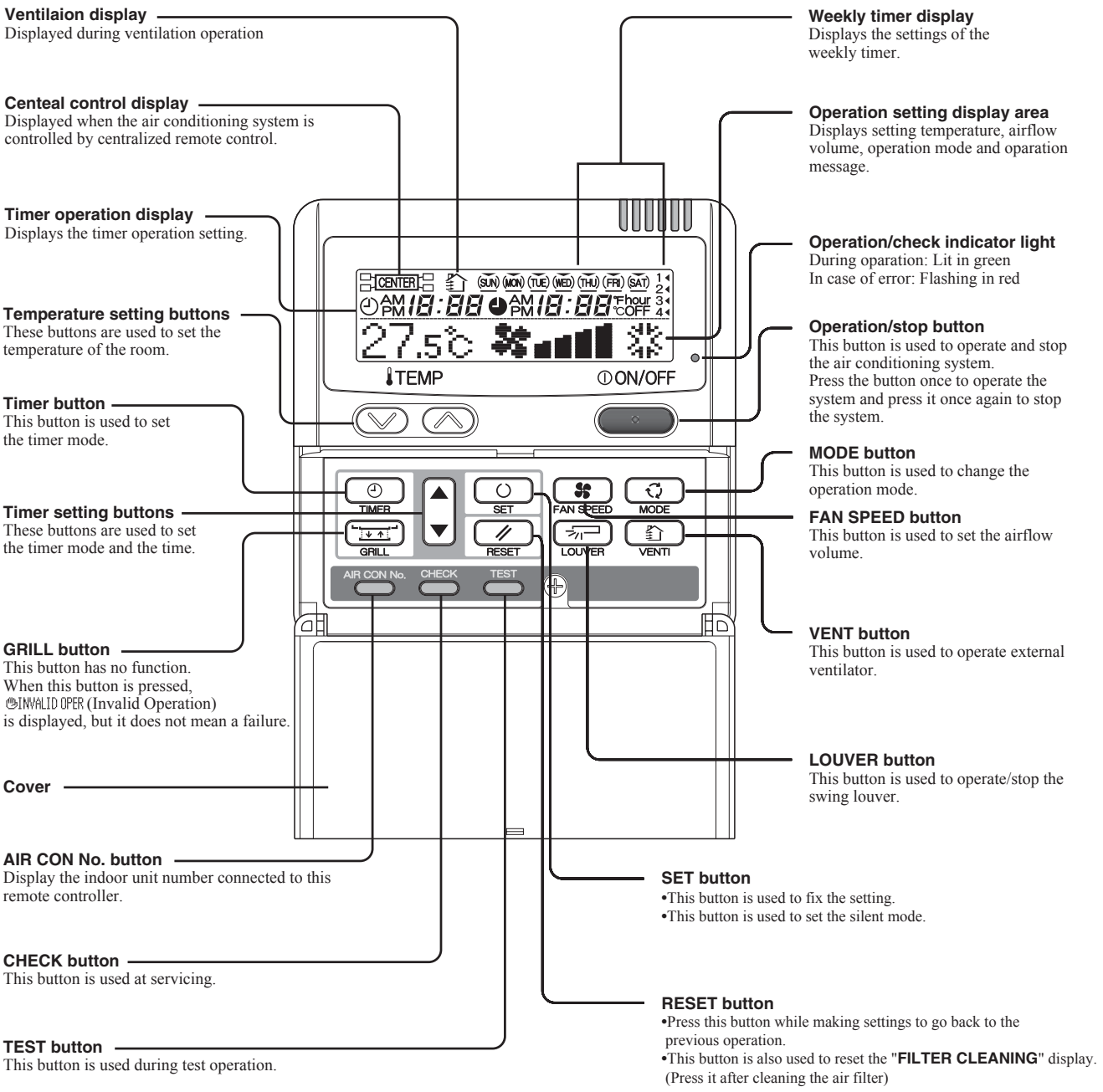
# 1. OUTLINE OF OPERATION CONTROL BY MICROCOMPUTER

## 1.1 Remote controller

### (1) Wired remote controller

The figure below shows the remote controller with the cover opened. Note that all the items that may be displayed in the liquid crystal display area are shown in the figure for the sake of explanation
Characters displayed with dots in the liquid crystal display area are abbreviated.

The figure below shows the remote control with the cover opened.

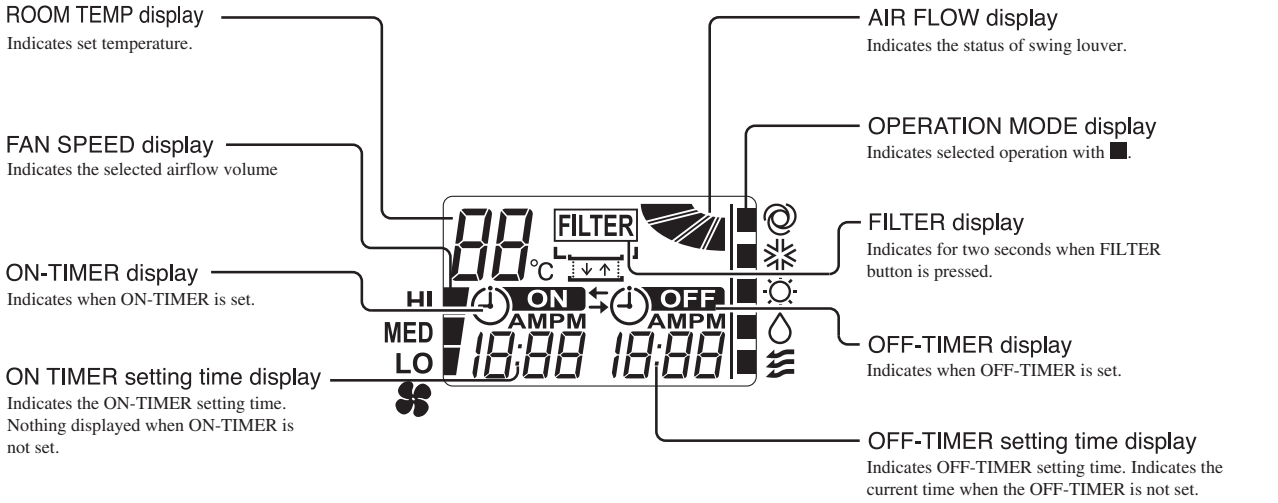

Ventilaion display
Displayed during ventilation operation
Centeal control display
Displayed when the air conditioning system is controlled by centralized remote control.
Timer operation display
Displays the timer operation setting.
Temperature setting buttons
These buttons are used to set the temperature of the room.
Timer button
This button is used to set the timer mode.
Timer setting buttons
These buttons are used to set the timer mode and the time.
GRILL button
This button has no function.
When this button is pressed,
INVALID OPER (Invalid Operation)
is displayed, but it does not mean a failure.
Cover
AIR CON No. button
Display the indoor unit number connected to this remote controller.
CHECK button
This button is used at servicing.
TEST button
This button is used during test operation.
Weekly timer display
Displays the settings of the weekly timer.
Operation setting display area
Displays setting temperature, airflow volume, operation mode and oparation message.
Operation/check indicator light
During oparation: Lit in green
In case of error: Flashing in red
Operation/stop button
This button is used to operate and stop the air conditioning system.
Press the button once to operate the system and press it once again to stop the system.
MODE button
This button is used to change the operation mode.
FAN SPEED button
This button is used to set the airflow volume.
VENT button
This button is used to operate external ventilator.
LOUVER button
This button is used to operate/stop the swing louver.
SET button
•This button is used to fix the setting.
•This button is used to set the silent mode.
RESET button
•Press this button while making settings to go back to the previous operation.
•This button is also used to reset the "FILTER CLEANING" display. (Press it after cleaning the air filter)
CENTER
SUN MON TUE WED THU FRI SAT
AM PM 12:00
27.5°C
TEMP
ON/OFF
TIMER
SET
FAN SPEED
MODE
GRILL
RESET
LOUVER
VENTI
AIR CON No.
CHECK
TEST

∗ All displays are described in the liguid crystal display for explanation.

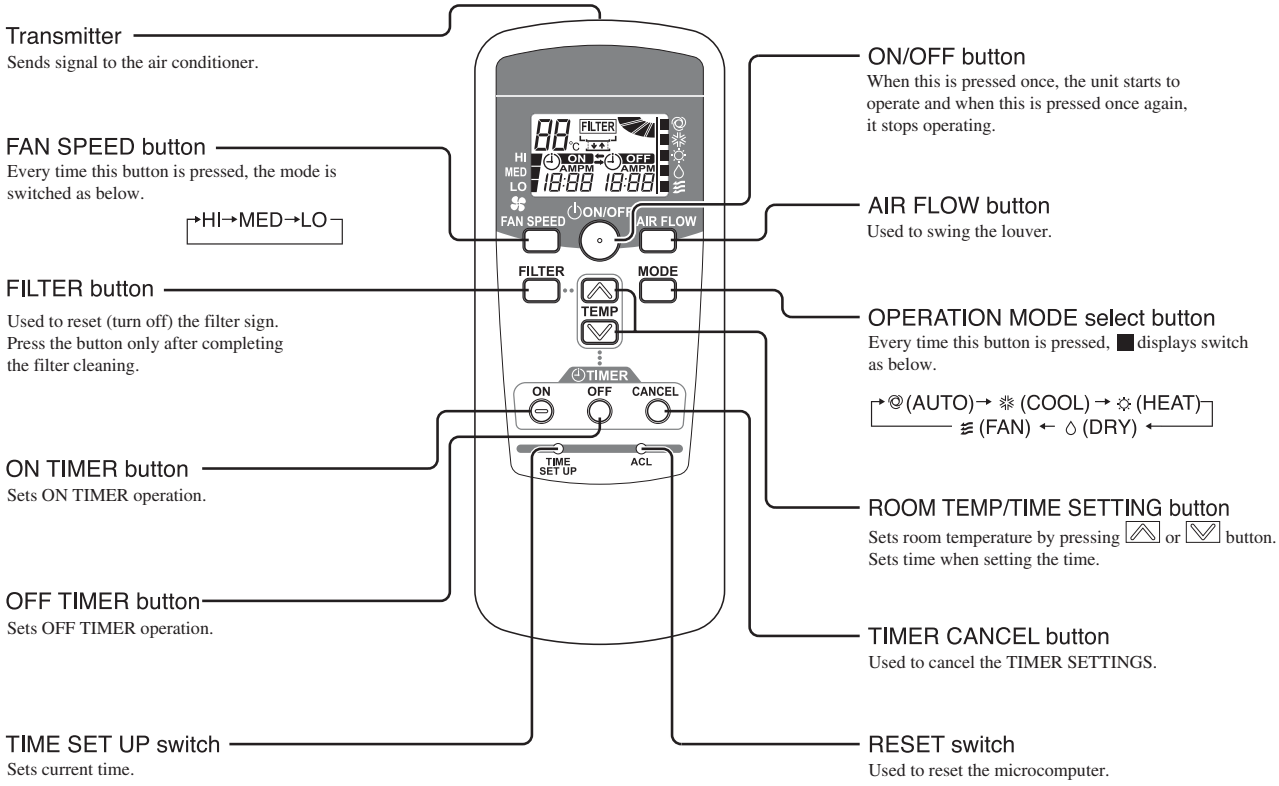
**(2) Wireless remote controller**

**◆FDEN series only**

## Indication section



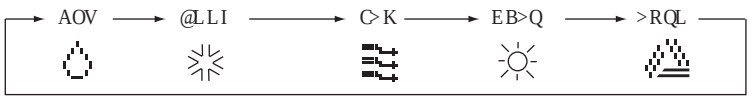

## Operation section


Transmitter
Sends signal to the air conditioner.
FAN SPEED button
Every time this button is pressed, the mode is switched as below.
→HI→MED→LO
FILTER button
Used to reset (turn off) the filter sign. Press the button only after completing the filter cleaning.
ON TIMER button
Sets ON TIMER operation.
OFF TIMER button
Sets OFF TIMER operation.
TIME SET UP switch
Sets current time.
ON/OFF button
When this is pressed once, the unit starts to operate and when this is pressed once again, it stops operating.
AIR FLOW button
Used to swing the louver.
OPERATION MODE select button
Every time this button is pressed, ■ displays switch as below.
→(AUTO)→ (COOL) → (HEAT)
(FAN) ← (DRY) ←
ROOM TEMP/TIME SETTING button
Sets room temperature by pressing or button. Sets time when setting the time.
TIMER CANCEL button
Used to cancel the TIMER SETTINGS.
RESET switch
Used to reset the microcomputer.
FAN SPEED
ON/OFF
AIR FLOW
FILTER
MODE
TEMP
TIMER
ON
OFF
CANCEL
TIME SET UP
ACL

* All displays are described in the liquid crystal display for explanation

## 1.2 Operation control function by the wired remote controller

### (1) Switching sequence of the operation mode switches of remote controller




### (2) [CPU reset]

This functions when “CHECK” and “GRILL” buttons on the remote controller are pressed simultaneously. Operation is same as that of the power supply reset.

### (3) [Power failure compensation function]...Electric power supply failure

- This becomes effective if “Power failure compensation effective” is selected with the setting of remote controller function.
- Since it memorizes always the condition of remote controller, it starts operation according to the contents of memory no sooner than normal state is recovered after the power failure. Although the auto swing stop position and the timer mode are cancelled, the weekly timer setting is restored with the holiday setting for all weekdays.
  After recovering from the power failure, it readjusts the clock and resets the holiday setting for each weekday so that the setting of weekly timer becomes effective.
- Content memorized with the power failure compensation are as follows.

Note (1) Items⑥, ⑦ and ⑧ are memorized regardless whether the power failure compensation is effective or not while the setting of silent mode is cancelled regardless whether the power failure compensation is effective or not.

① At power failure – Operating/stopped
If it had been operating under the off timer mode, sleep timer mode, the state of stop is memorized. (Although the timer mode is cancelled at the recovery from power failure, the setting of weekly timer is changed to the holiday setting for all weekdays.)

② Operation mode

③ Airflow volume mode

④ Room temperature setting

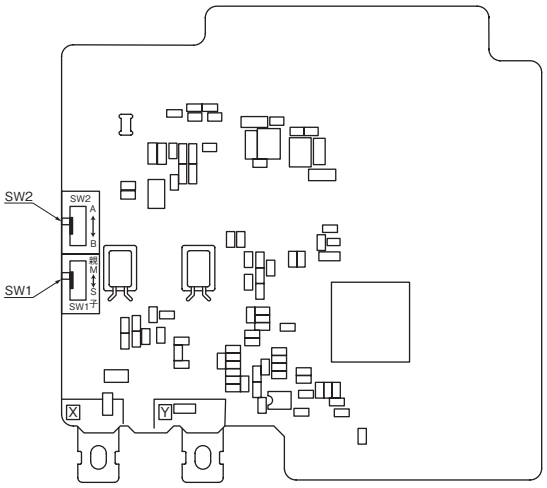
⑤ Louver auto swing/stop
However, the stop position (4-position) is cancelled so that it returns to Position (1).

⑥ “Remote controller function items” which have been set with the remote controller function setting (“Indoor function items” are saved in the memory of indoor unit.)

⑦ Upper limit value and lower limit value which have been set with the temperature setting control

⑧ Sleep timer and weekly timer settings (Other timer settings are not memorized.)

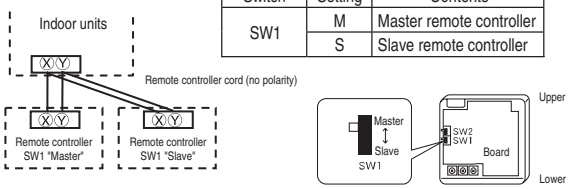
**[Parts layout on remote controller PCB]**




**Master/ slave setting when more than one remote controllers are used**

A maximum of two remote controllers can be connected to one indoor unit (or one group of indoor units.)

| Switch | Setting | Contents |
|---|---|---|
| SW1 | M | Master remote controller |
| | S | Slave remote controller |




Set SW1 to "Slave" for the slave remote controller. It was factory set to "Master" for shipment.

Note: The setting "Remote controller thermistor enabled" is only selectable with the master remote controller in the position where you want to check room temperature.
The air conditioner operation follows the last operation of the remote controller regardless of the master/ slave setting of it.

Caution

When using multiple remote controllers, the following dispiays or settings cannot be done with the slave remote controller. It is available only with the master remote controller.

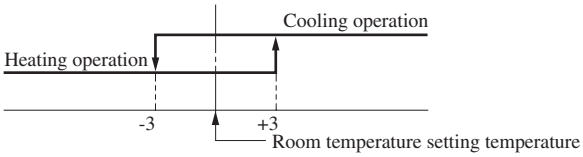
①Louver position setting (set upper or lower limit of swinging range)
②Setting indoor unit functions
③Setting temperature range
④Operation data display
⑤Error data display
⑥Silent mode setting
⑦Test operation of drain pump
⑧Remote controller sensor setting

## 1.3 Operation control function by the indoor controller

### (1) FDTC, FDT, FDEN, FDUM and FDU series

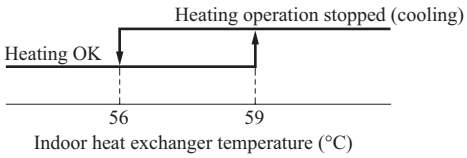
### (a) Auto operation

If "Auto" mode is selected by the remote controller, the heating and the cooling are automatically switched according to the difference between outdoor air temperature and setting temperature and the difference between setting temperature and return air temperature. (When the switching of cooling mode ↔ heating mode takes place within 3 minutes, the compressor does not operate for 3 minutes by the control of 3-minute timer.) This will facilitate the cooling/heating switching operation in intermediate seasons and the adaptation to unmanned operation at stores, etc (ATM corner of bank).




Note (1) Room temperature control during auto cooling/auto heating is performed according to the room temperature setting temperature. (DIFF: ±1 deg)

(2) If the indoor heat exchanger temperature rises to 59°C or higher during heating operation, it is switched automatically to cooling operation. In addition, for 1 hour after this switching, the heating operation is not performed, regardless of the temperature shown at right.




### (b) Operations of functional items during cooling/heating

| Operation / Functional item | Cooling | | Fan | Heating | | | Dehumidify |
|---|---|---|---|---|---|---|---|
| | Thermostat ON | Thermostat OFF | | Thermostat ON | Thermostat OFF | Hot start (Defrost) | |
| Compressor | ○ | × | × | ○ | × | ○ | ○/× |
| 4-way valve | × | × | × | ○ | ○ | ○(×) | × |
| Outdoor unit fan | ○ | × | × | ○ | × | ○(×) | ○/× |
| Indoor unit fan | ○ | ○ | ○ | ○/× | ○/× | ○/× | ○/× |
| Louver motor | ○/× | | | ○/× | ○/× | ○/× | ○/× |
| Drain pump (3) | ○ | ×(2) | ×(2) | ○/×(2) | | | Thermostat ON: ○ Thermostat OFF: ×(2) |

Note (1) ○: Operation ×: Stop ○/×: Turned ON/OFF by the control other than the room temperature control.
(2) ON during the drain motor delay control.
(3) Drain pump ON setting may be selected with the indoor unit function setting of the wired remote controller.

### (c) Dehumidifying operation

Return air temperature thermistor [Thı-A (by the remote controller when the remote controller thermistor is enabled)] controls the indoor temperature environment simultaneously.

1) Operation is started in the cooling mode. When the difference between the return air temperature and the setting temperature is 2°C or less, the indoor unit fan tap is brought down by one tap. That tap is retained for 3 minutes after changing the indoor unit fan tap.
2) If the return air temperature exceeds the setting temperature by 3°C during defrosting operation, the indoor unit fan tap is raised. That tap is retained for 3 minutes after changing the indoor unit fan tap.
3) If the thermostat OFF is established during the above control, the indoor unit fan tap at the thermostat ON is retained so far as the thermostat is turned OFF.
4) After stopping the cooling operation, the indoor unit continues to run at Lo for 15 seconds.

**(d) Timer operation**

1) Sleep timer

Set the duration of time from the present to the time to turn off the air-conditioner.

It can be selected from 10 steps in the range from "OFF 1 hour later" to "OFF 10 hours later". After the sleep timer setting, the remaining time is displayed with progress of time in the unit of hour.

2) OFF timer

Time to turn OFF the air-conditioner can be set in the unit of 10 minutes.

3) ON timer

Time to turn ON the air-conditioner can be set. Indoor temperature can be set simultaneously.

4) Weekly timer

Timer operation (ON timer, OFF timer) can be set up to 4 times a day for each weekday.

5) Timer operations which can be set in combination

| Item \ Item | Sleep timer | OFF timer | ON timer | Weekly timer |
|---|---|---|---|---|
| Sleep timer | | × | ○ | × |
| OFF timer | × | | ○ | × |
| ON timer | ○ | ○ | | × |
| Weekly timer | × | × | × | |

Note (1) ○: Allowed ×: Not

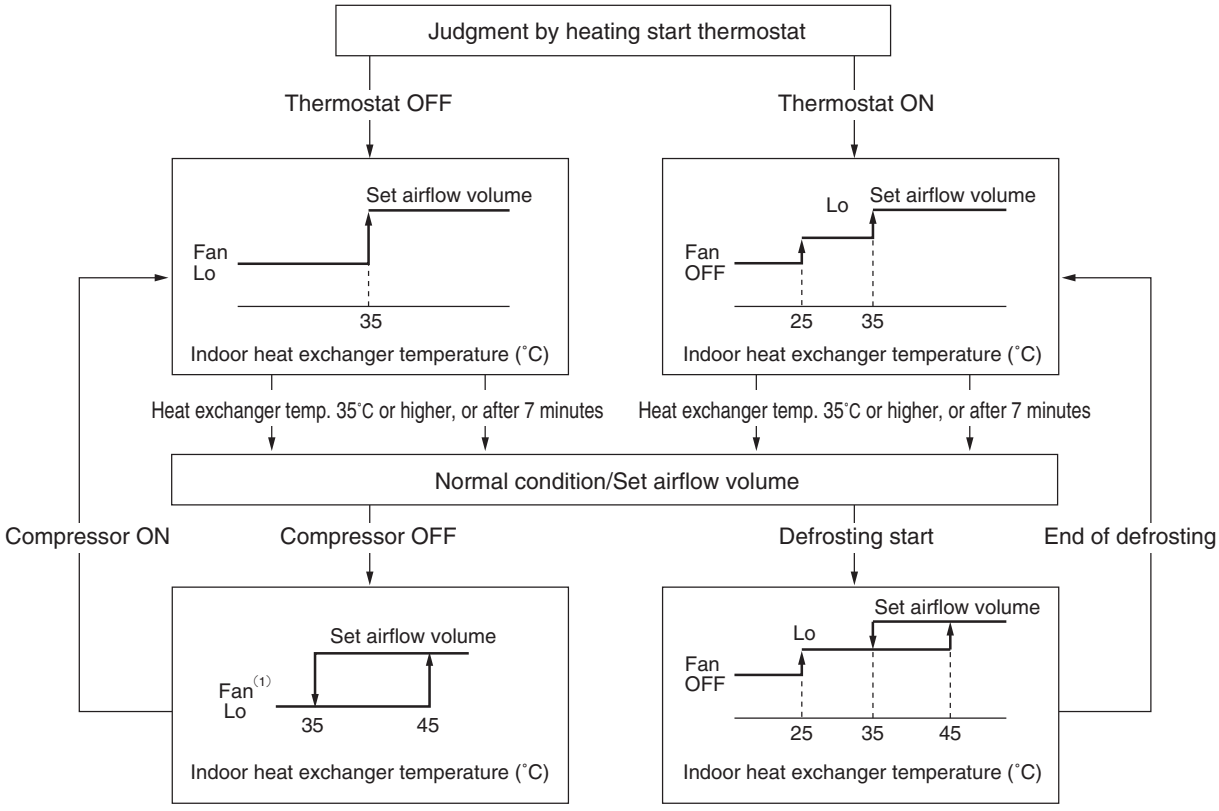
**(e) Remote controller display during the operation stop**

1) "Centralized control ON" is displayed always on the LCD under the "Center/Remote" and "Center" modes during the operation stop (Power ON). This is not displayed under the "Remote" mode.

2) If this display is not shown under the "Center/Remote" mode, check if the indoor unit power switch is turned on or not.

**(f) Hot start (Cold draft prevention at heating)**

At the startup of heating operation, at resetting of the thermostat, during defrost operation and at returning to heating, the indoor fan is controlled by the indoor heat exchanger temperature (detected with Thı-R) for preventing the cold draft.




Note (1) Heating preparation is displayed during the hot start (when the compressor is operating and the indoor fan does not provide the set airflow volume).

**(g) Hot keep**

Hot keep control is performed at the start of the defrost control.

1) Control
   a) When the indoor heat exchanger temperature (detected with Thı-R1 or R2) drops to 35°C or lower, the speed of indoor fan is changed to the lower tap at each setting.
   b) During the hot keep, the louver horizontal control signal is transmitted.
2) Ending condition
   When the indoor fan is at the lower tap at each setting, it returns to the set airflow volume as the indoor heat exchanger temperature rises to 45°C or higher.

**(h) Fan control during the heating thermostat OFF**

When the heating thermostat is turned OFF, the setting of the fan control is selectable using the indoor function of wired remote controller [☼ FAN CONTROL].

1) Low fan speed (Factory default)
   If the indoor heat exchanger temperature drops below 35°C with the heating thermostat OFF, the indoor fan operate at the lower speed tap at each setting.
2) Set fan speed
   Even if the indoor heat exchanger temperature drops below 35°C with the heating thermostat OFF, the indoor fan continues to run at the set airflow volume.
3) Intermittence
   If the indoor heat exchanger temperature drops below 35°C with the heating thermostat OFF, the indoor fan operates at the lower speed tap at each setting and, when the indoor heater exchanger temperature drops below 25°C, the indoor fan stops for 5 minutes. Then the fan runs at the low speed tap for 2 minutes, and the judgment is made by the thermostat.
4) Fan OFF
   If the indoor heat exchanger temperature drops below 35°C with the heating thermostat OFF, the indoor fan is turned OFF. The same applies also when the remote controller sensor is effective.

**(i) Filter sign**

As the operation time (Total ON time of ON/OFF switch) accumulates to 180 hours (1), "FILTER CLEANING" is displayed on the remote controller. (This is displayed when the unit is in trouble and under the centralized control, regardless of ON/OFF)

Note (1) Time setting for the filter sign can be made as shown below using the indoor function of wired remote controller "FILTER SIGN SET". (It is set at 1 at the shipping from factory.)

| Filter sign setting | Function |
|---|---|
| **TYPE 1** | Setting time: 180 hrs (Factory default) |
| **TYPE 2** | Setting time: 600 hrs |
| **TYPE 3** | Setting time: 1,000 hrs |
| **TYPE 4** | Setting time: 1,000 hrs (Unit stop) (2) |

(2) After the setting time has elapsed, the "FILTER CLEANING" is displayed and, after operating for 24 hours further (counted also during the stop), the unit stops.

**(j) Auto swing control [Applicable model: FDTC, FDT and FDEN]**

1) Louver control
   a) Press the "LOUVER" button to operate the swing louver when the air conditioner is operating.
   "SWING" is displayed for 3 seconds and then the swing louver moves up and down continuously.
   b) To fix the swing louver at a position, press one time the "LOUVER" button while the swing louver is moving so that four stop positions are displayed one after another per second.
   When a desired stop position is displayed, press the "LOUVER" button again. The display stops, changes to show the "STOP 1" for 5 seconds and then the swing louver stops.
   c) Louver operation at the power on with a unit having the louver 4-position control function
   The louver swings one time automatically (without operating the remote controller) at the power on.
   This allows inputting the louver motor (LM) position, which is necessary for the microcomputer to recognize the louver position.

Note (1) If you press the "LOUVER" button, the swing motion is displayed on the louver position LCD for 10 second. The display changes to the "SWING" display 3 seconds later.

2) Automatic louver level setting during heating

At the hot start with the heating thermostat OFF, regardless whether the auto swing switch is operated or not (auto swing or louver stop), the louver takes the level position (In order to prevent the cold start). The louver position display LCD continues to show the display which has been shown before entering this control.

3) Louver-free stop control

When the louver-free stop has been selected with the indoor function of wired remote controller "⇄ POSITION", the louver motor stops when it receives the stop signal from the remote controller. If the auto swing signal is received from the remote controller, the auto swing will start from the position where it was before the stop.

Note (1) When the indoor function of wired remote controller "⇄ POSITION" has been switched, switch also the remote control function "⇄ POSITION" in the same way.

### (k) Compressor inching prevention control

1) 3-minute timer

When the compressor has been stopped by the thermostat, remote controller operation switch or anomalous condition, its restart will be inhibited for 3 minutes. However, the 3-minute timer is invalidated at the power on the electric power source for the unit.

2) 3-minute forced operation timer

- Compressor will not stop for 3 minutes after the compressor ON. However, it stops immediately when the unit is stopped by means of the ON/OFF switch or by when the thermister turned OFF the change of operation mode.
- If the thermostat is turned OFF during the forced operation control of heating compressor, the louver position (with the auto swing) is returned to the level position.

Note (1) The compressor stops when it has entered the protective control.

### (l) Drain motor (DM) control [Applicable model: FDTC, FDT and FDUM]

1) Drain motor (DM) is operated during the cooling or dehumidifying mode operations and simultaneously with the compressor ON. The DM continues to operate for 5 minutes after the operation stop, anomalous stop, thermostat stop or when it was switched from the cooling and dehumidifying operations to the fan or heating operation.

| | Indoor unit operation mode | | | | |
|---|---|---|---|---|---|
| | Stop (1) | Cooling | Dehumidifying | Fan (2) | Heating |
| Compressor ON | | Control A | | | |
| Compressor OFF | Control B | | | | |

Note (1) Including the stop from the cooling, dehumidifying, fan and heating, and the anomalous stop
(2) Including the "Fan" operation according to the mismatch of operation modes

a) Control A

i) If the float switch detects any anomalous draining condition, the unit stops with the anomalous stop (displays E9) and the drain pump starts. After detecting the anomalous condition, the drain motor continues to be ON.

ii) It keeps operating while the float switch is detecting the anomalous condition.

b) Control B

If the float switch detects any anomalous drain condition, the drain motor is turned ON for 5 minutes, and at 10 seconds after the drain motor OFF it checks the float switch. If it is normal, the unit is stopped under the normal mode or, if there is any anomalous condition, E9 is displayed and the drain motor is turned ON. (The ON condition is maintained during the drain detection.)

2) Drain motor (DM) interlock control

a) Start conditions

Depending on the function setting by the remote controller, the drain motor is turned ON under either one of the following conditions.

i) During heating mode operation (Both the thermostat ON/OFF)

ii) During heating mode operation (Both the thermostat ON/OFF) + Fan operation

iii) Fan operation

b) End conditions

The drain motor is turned OFF 5 minutes after the stop of operations i) to iii) above.

### (m) Operation check/drain pump test run operation mode

1) If the power is turned on by the dip switch (SW7-1) on the indoor PCB when electric power source is supplied, it enters the mode of operation check/drain pump test run. It is ineffective (prohibited) to change the switch after turning power on.

2) When the communication with the remote controller has been established within 60 seconds after turning power on by the dip switch (SW7-1) ON, it enters the operation check mode. Unless the remote controller communication is established, it enters the drain pump test run mode.

Note (1) To select the drain pump test run mode, disconnect the remote controller connector (CNB) on the indoor PCB to shut down the remote controller communication.

3) Operation check mode

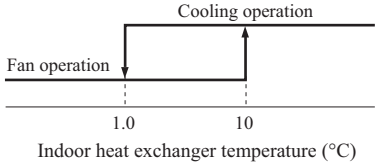
There is no communication with the outdoor unit but it allows performing operation in respective modes by operating the remote controller.

4) Drain pump test run mode

As the drain pump test run is established, the drain pump only operates and during the operation protective functions by the microcomputer of indoor unit become ineffective.

**(n) Cooling, dehumidifying frost protection**

1) To prevent frosting during cooling mode or dehumidifying mode operation, the of compressor speed is reduced if the indoor heat exchanger temperature (detected with Thı-R) drops to 1.0 °C or lower at 4 minutes after the start of compressor operation. If the indoor unit heat exchanger temperature is 1.0 °C or lower after 1 minutes, the compressor speed is reduced further. If it becomes 2.5 °C or higher, the control terminates. When the indoor heat exchanger temperature has become as show below after reducing the compressor speed, it is switched to the fan operation. For the selection of indoor fan speed, refer to item 2).




2) Selection of indoor fan speed

If it enters the frost prevention control during cooling operation (excluding dehumidifying), the indoor unit fan speed is switched.

(a) In cases of FDUM, FDU and FDEN

i) When the indoor unit return air temperature (detected with Thı-A) is 23°C or lower, this control is invalidated and, as 2 hours elapse after starting the frost prevention control, it is terminated.

ii) If it is detected again within 15 minutes from the start of frost prevention control, the indoor fan speed is raised by 1 tap to increase the indoor unit fan speed. If it is detected within further 15 minutes, the indoor unit fan speed is raised by 1 tap more.

Note (1) Indoor unit fan speed can be increased by up to 2 taps.

iii) "FAN SPEED SW VALID/INVALID" of this control is selectable with the function setting of remote controller.

b) In the case of FDT and FDTC

i) When the indoor return air detection temperature (detected with Thı-A) is 23°C or higher and the indoor heat exchanger temperature (detected with Thı-R) detects the compressor frequency drop start temperature A°C+1°C, of indoor unit fan speed is increased by 20rpm.

ii) If the phenomenon of i) above is detected again after the acceleration of indoor unit fan, indoor unit fan speed is increased further by 20rpm.

Note (1) Indoor unit fan speed can be increased by up to 2 taps.

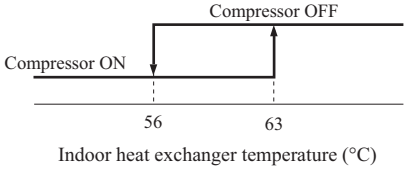
• Compressor frequency drop start temperature

| Item \ Symbol | A |
|---|---|
| Temperature - Low (Factory default) | 1.0 |
| Temperature - High | 2.5 |

Note (1) Frost prevention temperature setting can be selected with the indoor unit function setting of the wired remote controller.

**(o) Heating overload protection**

1) If the indoor heat exchanger temperature (detected with Thı-R) at 63°C or higher is detected for 2 seconds continuously, the compressor stops. When the compressor is restarted after a 3-minute delay, if a temperature at 63°C or higher is detected for 2 seconds continuously within 60 minutes after initial detection and if this is detected 5 times consecutively, the compressor stops with the anomalous stop (E8). Anomalous stop occurs also when the indoor heat exchanger temperature at 63°C or higher is detected for 6 minutes continuously.




2) Indoor unit fan speed selection

If, after second detection of heating overload protection up to fourth, the indoor fan is set at Me and Lo taps when the compressor is turned ON, the indoor fan speed is increased by 1 tap.

**(p) Anomalous fan motor [In case of FDT, FDTC only]**

After starting the fan motor, if the fan motor speed is 200rpm or less is detected for 30 seconds continuously and 4 times within 60 minutes, then fan motor stops with the anomalous stop (E16).

**(q) Plural unit control – Control of 16 units group by one remote controller**

1) Function

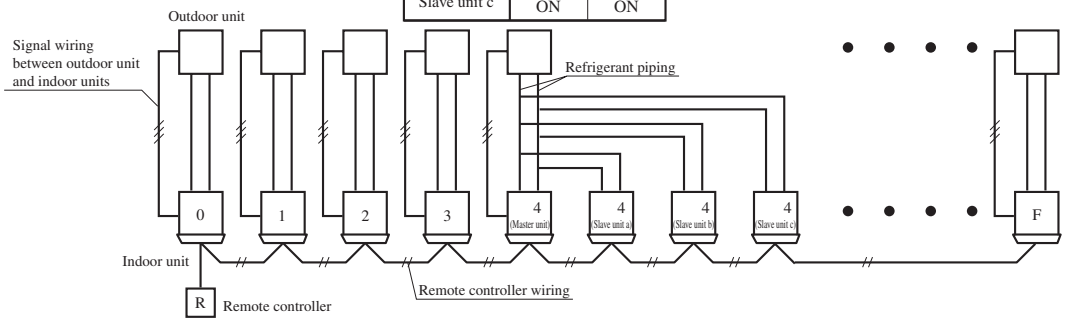
One remote controller switch can control a group of multiple number of unit (Max. 16 indoor units). "Operation mode" which is set by the remote controller switch can operate or stop all units in the group one after another in the order of unit No.(1). Thermostat and protective function of each unit function independently.

Note (1) Unit No. is set by SW2 on the indoor unit control PCB. Unit No. setting by SW2 is necessary for the indoor unit only. In cases of the twin, triple and double-twin specification, it is necessary set for the master and the slave units. This can be selected by SW5. (All are set for the master unit at the shipping from factory.)

SW2: For setting of 0 – 9, A – F
SW5: For setting of master and slave units
(See table shown at right.)

SW5 setting

| Switch / Unit | SW5-1 | SW5-2 |
|---|---|---|
| Master unit | OFF | OFF |
| Slave unit a | OFF | ON |
| Slave unit b | ON | OFF |
| Slave unit c | ON | ON |




(2) Unit No. may be set at random unless duplicated, it should be better to set orderly like 0, 1, 2…, F to avoid mistake.

2) Display to the remote controller

a) Center or each remote controller basis, heating preparation: the youngest unit No. among the operating units in the remote mode (or the center mode unless the remote mode is available) is displayed.

b) Inspection display, filter sign: Any of unit that starts initially is displayed.

c) Confirmation of connected units
Pressing "AIR CON No." button on the remote controller displays the indoor unit address. If "▲" "▼" button is pressed at the next, it is displayed orderly starting from the unit of youngest No.

d) In case of anomaly

i) If any anomaly occurs on a unit in a group (a protective function operates), that unit stops with the anomalous stop but any other normal units continue to run as they are.

ii) Signal wiring procedure
Signal wiring between indoor and outdoor units should be made on each unit same as the normal wiring. For the group control, lay connect with sires wiring between rooms using terminal blocks (X, Y) of remote controller.
Connect the remote controller communication wire separately from the power supply wire or wires of other electric devices (AC220V or higher).

**(r) High ceiling control**

In the case of indoor unit installed in a higher ceiling room, the airflow volume mode control can be changed with the wired remote controller indoor unit function "FAN SPEED SET".

| Fan tap | | Indoor unit airflow setting | | | |
|---|---|---|---|---|---|
| | | ▮▮▮ - ▮▮ - ▮ - ▯ | ▮▮▮ - ▮▮ - ▮ | ▮▮▮ - ▮ | ▮▮▮ - ▮▮ |
| FAN SPEED SET | STANDARD | UH - Hi - Me - Lo | Hi - Me - Lo | Hi - Lo | Hi - Me |
| | HIGH SPEED1, 2 | UH - UH - Hi - Me | UH - Hi - Me | UH - Me | UH - Hi |

Note (1) Factory default is Standard.

(2) At the hot-start and heating thermostat OFF, or other, the indoor unit fan is operated at the low speed tap of each setting.

**(s) Abnormal temperature thermistor (return air/indoor heat exchanger) wire/short-circuit detection**

1) Broken wire detection

When the return air temperature thermistor detects -50°C or lower or the heat exchanger temperature thermistor detect -50°C or lower for 5 seconds continuously, the compressor stops. After a 3-minute delay, the compressor restarts but, if it is detected again within 60 minutes after the initial detection for 6 minutes continuously, stops again (the return air temperature thermistor: E7, the heat exchanger temperature thermistor: E6).

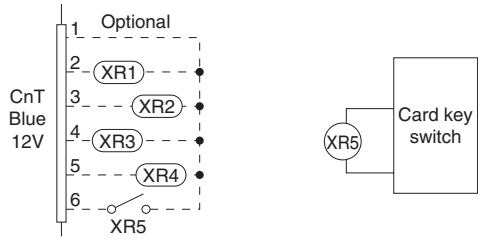
2) Short-circuit detection

If the heat exchanger temperature thermistor detects 70°C or higher for 5 seconds continuously at 2 minutes and 20 seconds after the compressor ON during cooling operation, the compressor stops (E6).

**(t) Operation permission/prohibition**

**(In case of adopting card key switches or commercially available timers)**

When the indoor function setting of wired remote controller for "Operation permission/prohibition" is changed from "Invalid (Factory default)" to " Valid", following control becomes effective.




| | Normal operation (Factory default) | | Operation permission/prohibition mode "Valid" (Local setting) | |
|---|---|---|---|---|
| CnT-6 | ON | OFF | ON | OFF |
| | Operation | Stop | Operation permission*1 | Operation prohibition (Unit stops) |

*1 **Only the "LEVEL INPUT" is acceptable for external input**, however when the indoor function setting of "Level input (Factory default)" or "Pulse input" is selected by the function for "External input" of the wired remote controller, operation status will be changed as follows.

| In case of "Level input" setting | In case of "Pulse input" setting |
|---|---|
| Unit operation from the wired remote controller becomes available*(1) | Unit starts operation *(2) |

*(1) In case that "Operation permission/prohibition mode" setting is "Valid" and "External input" setting is "Level input (Factory default)";

① When card key switch is ON (CnT-6 ON: Operation permission), start/stop operation of the unit from the wired remote controller becomes available.

② When card key switch is OFF (CnT-6 OFF: Operation prohibition), the unit stops operation in conjunction with OFF signal, and start/stop operation of the unit from the wired remote controller becomes not available.

*(2) In case that "Operation permission/prohibition mode" setting is "Valid" and "External input" setting is "Pulse input (Local setting)";

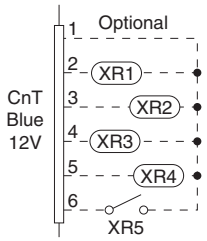
① When card key switch is ON (Operation permission), the unit starts operation in conjunction with ON signal. and also start/stop operation of the unit from the wired remote controller becomes available.

② When card key switch is OFF (Operation prohibition), the unit stops operation in conjunction with OFF signal, and start/stop operation of the unit from the wired remote controller becomes not available.

(3) This function is invalid only at "Center mode" setting done by central controller.

### (u) External input/output control (CnT)

Be sure to connect the wired remote controller to the indoor unit. Without wired remote controller remote operation by CnT is not possible to perform.




| | |
|---|---|
| ①Operation output | (CnT-2: XR1) |
| ②Heating output | (CnT-3: XR2) |
| ③Thermostat ON output | (CnT-4: XR3) |
| ④Error output | (CnT-5: XR4) |
| ⑤Remote operation input | (CnT-6: No-voltage contactor) |

#### 1) Output for external control (remote display)

Following output connectors (CnT) are provided on the indoor control PCB for monitoring operation status.

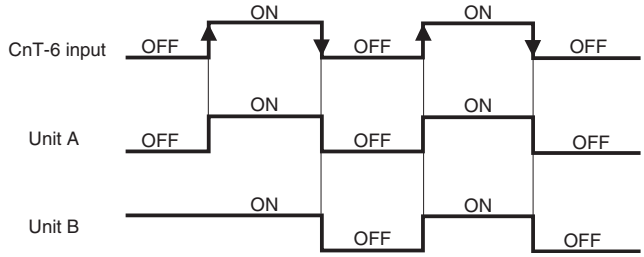
① **Operation output:** Outputs DC12V signal for driving relay during operation
② **Heating output:** Outputs DC12V signal for driving relay during heating operation
③ **Thermostat ON output:** Outputs DC12V signal for driving relay when compressor is operating.
④ **Error output:** Outputs DC12V signal for driving relay when anomalous condition occurs.

#### 2) Remote operation input

Remote operation input connector (CnT-6) is provided on the indoor control PCB.
However remote operation by CnT-6 is not effective, when "Center mode" is selected by center controller.
In case of plural unit (twin, triple, double twin), remote operation input to CnT-6 on the slave indoor unit is invalid.
**Only the "LEVEL INPUT" is acceptable for external input**, however when the indoor function setting of "Level input (Factory default)" or "Pulse input" is selected by the function for "External input" of the wired remote controller, operation status will be changed as follows.

##### a) In case of "Level input" setting (Factory default)

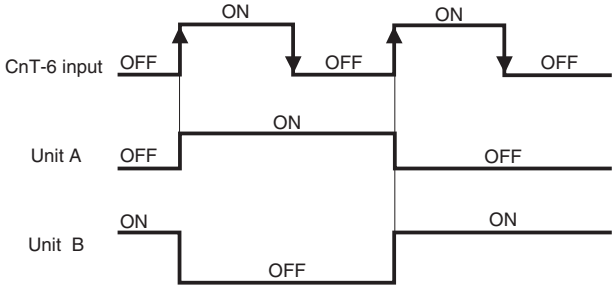
Input signal to CnT-6 is OFF→ON …… unit ON
Input signal to CnT-6 is ON→OFF …… unit OFF
Operation is not inverted.




Note: The latest operation has priority
It is available to operate/stop by remote controller or center controller

##### b) In case of "Pulse input" setting (Local setting)

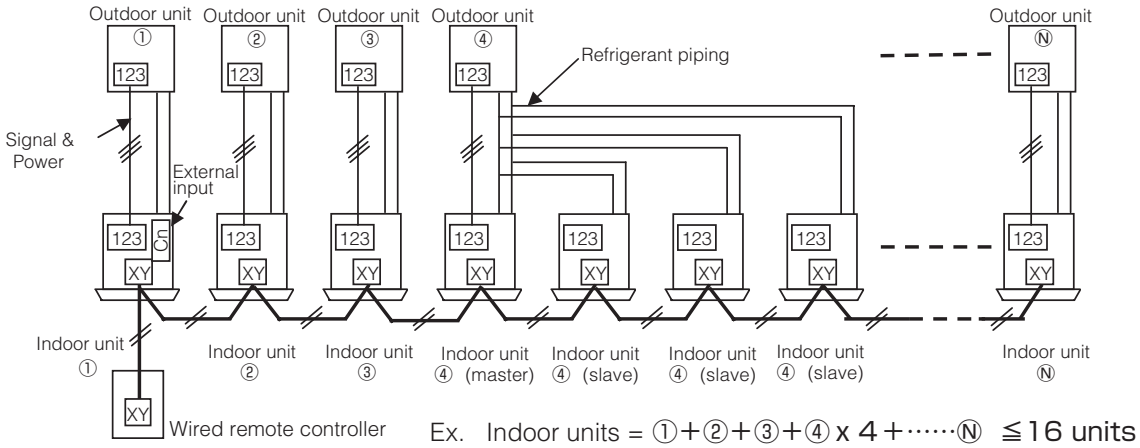
It is effective only when the input signal to CnT-6 is changed OFF→ON, and at that time unit operation [ON/OFF] is inverted.



**3) Remote operation**

**a) In case of multiple units (Max. 16 indoor units group) are connected to one wired remote controller**

When the indoor function setting of wired remote controller for "External control set" is changed from "Individual (Factory default)" to " For all units", all units connected in one wired remote controller system can be controlled by external operation input.




| | Individual operation (Factory default) | | All units operation (Local setting) | |
|---|---|---|---|---|
| CnT-6 | ON | OFF | ON | OFF |
| | Only the unit directly connected to the remote controller can be operated. | Only the unit directly connected to the remote controller can be stopped opeartion. | All units in one remote controller system can be operated. | All units in one remote controller system can be stopped operation. |
| | Unit ① only | Unit ① only | Units ① – Ⓝ | Units ① – Ⓝ |

When more than one indoor unit (Max. 16 indoor units) are connected in one wired remote controller system:

(1) With the factory default, external input to CnT-6 is effective for only the unit ①.

(2) When setting "For all unit" (Local setting), all units in one remote controller system can be controlled by external input to CnT-6 on the indoor unit ①.

(3) External input to CnT-6 on the other indoor unit than the unit ① is not effective.

**(v) Fan control at heating startup (Applicable model: FDTC and FDT)**

1) Start conditions

At the start of heating operation, if the difference of setting temperature and return air temperature is 5°C or higher after the end of hot start control, this control is performed.

2) Contents of control

a) Sampling is made at each minute and, when the indoor unit heat exchanger temperature (detected with Thı-R) is 37°C or higher, present number of revolutions of indoor unit fan speed is increased by $10min^{-1}$.

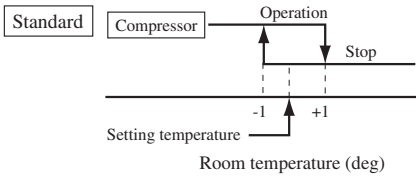
b) If the indoor unit heat exchanger temperature drops below 37°C at next sampling, present number of revolutions of indoor unit fan speed is reduced by $10min^{-1}$.

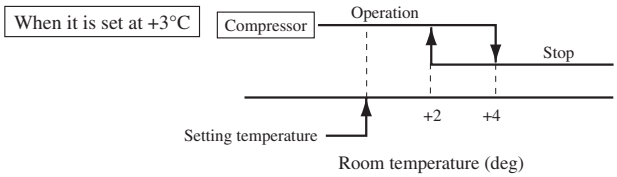
3) End conditions

Indoor fan speed is reduced to the setting airflow volume when the compressor OFF is established and at 30 minutes after the start of heating operation.

### (w) Room temperature detection temperature compensation during heating

With the standard specification, the compressor is turned ON/OFF with the thermostat setting temperature. When the thermostat is likely to turn OFF earlier because the unit is installed at the ceiling where warm air tends to accumulate, the setting can be changed with the wired remote controller indoor unit function "☼SP OFFSET". The compressor and the heater are turned ON/OFF at one of the setting temperature +3, +2 or +1°C in order to improve the feeling of heating. The setting temperature, however, has the upper limit of 30°C.




### (x) Return air temperature compensation

This is the function to compensate the deviation between the detection temperature by the return air temperature thermistor and the measured temperature after installing the unit.

1) It is adjustable in the unit of 0.5°C with the wired remote controller indoor unit function "RETURN AIR TEMP".
   • +1.0°C, +1.5°C, +2.0°C  • -1.0°C, -1.5°C, -2.0°C
2) Compensated temperature is transmitted to the remote controller and the compressor to control them.

Note (1) The detection temperature compensation is effective on the indoor unit thermistor only.

### (2) SRK series

### (a) Unit ON/OFF button

If the remote control is malfunctioning, this button may be used to turn the unit on and off.

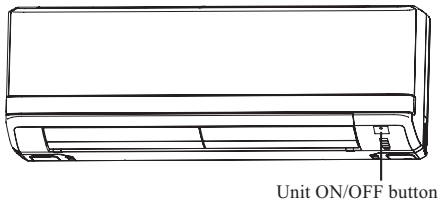
**1) Operation**

Push the button once to place the unit in the automatic mode. Push it once more to turn the unit off.

**2) Details of operation**

The unit will go into the automatic mode in which it automatically determines, from room temperature (as detected by sensor), whether to go into the cooling, thermal dry or heating modes.

| Function / Operation mode | Roon temperature setting | Fan speed | Swing contral | Timer switch |
|---|---|---|---|---|
| **Cooling** | About 24ºC | Auto | Auto | Continuous |
| **Thermal dry** | About 25ºC | | | |
| **Heating** | About 26ºC | | | |



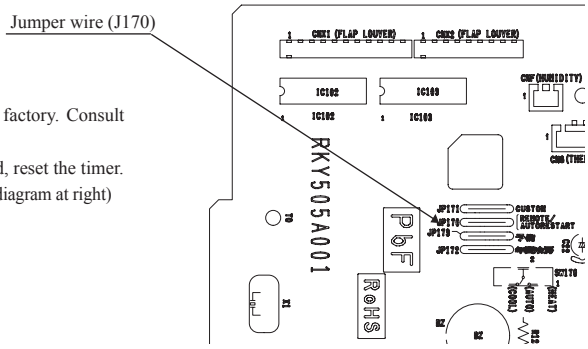

### (b) Auto restart function

**1)** Auto restart function records the operational status of the air-conditioner immediately prior to be switched off by a power cut, and then automatically resumes operations after the power has been restored.

**2)** The following settings will be cancelled:

- Timer settings

Notes (1) Auto restart function is set at on when the air-conditioner is shipped from the factory. Consult with your dealer if this function needs to be switched off.
(2) When power failure occurs, the timer setting is cancelled. Once power is resumed, reset the timer.
(3) If the jumper wire (J170) "AUTO RESTART" is cut, auto restart is disabled. (See the diagram at right)




### (c) Auto swing control

1) Louver control

a) Press the "LOUVER" button to operate the swing louver when the air conditioner is operating.
"AUTO" is displayed for 3 seconds and then the swing louver moves up and down continuously.

b) To fix the swing louver at a position, press one time the "LOUVER" button while the swing louver is moving so that four stop positions are displayed one after another per second.
When a desired stop position is displayed, press the "LOUVER" button again. The display stops, changes to show the "STOP 1" for 5 seconds and then the swing louver stops.

2) Automatic louver level setting during heating

At the hot start with the heating thermostat OFF, regardless whether the auto swing switch is operated or not (auto swing or louver stop), the louver takes the level position (In order to prevent the cold start). The louver position display LCD continues to show the display which has been shown before entering this control.

3) Louver-free stop control

When the louver-free stop has been selected with the indoor function of wired remote controller "POSITION", the louver motor stops when it receives the stop signal from the remote controller. If the auto swing signal is received from the remote controller, the auto swing will start from the position where it was before the stop.

Note (1) When the indoor function of wired remote controller "Louver control setting" has been switched, switch also the remote control function "POSITION" in the same way.

### (d) Timer operation

1) Timer
Set the duration of time from the present to the time to turn off the air-conditioner.
It can be selected from 10 steps in the range from "OFF 1 hour later" to "OFF 10 hours later". After the clock timer setting, the remaining time is displayed with progress of time in the unit of hour.
2) OFF timer
Time to turn OFF the air-conditioner can be set in the unit of 10 minutes.
3) ON timer
Time to turn ON the air-conditioner can be set. Indoor temperature can be set simultaneously.
4) Weekly timer
Timer operation (ON timer, OFF timer) can be set up to 4 times a day for each weekday.
5) Timer operations which can be set in combination

| Item / Item | Timer | OFF timer | ON timer | Weekly timer |
|---|---|---|---|---|
| Timer | | × | ○ | × |
| OFF timer | × | | ○ | × |
| ON timer | ○ | ○ | | × |
| Weekly timer | × | × | × | |

Note (1) ○: Allowed ×: Not

### (e) Remote controller display during the operation stop

1) "Centralized control ON" is displayed always on the LCD under the "Center/Remote" and "Center" modes during the operation stop (Power ON). This is not displayed under the "Remote" mode.
2) If this display is not shown under the "Center/Remote" mode, check if the indoor unit power switch is turned on or not.

### (f) Outline of heating or cooling operation

1) Operation of major functional components in heating mode

| | Heating | | |
|---|---|---|---|
| | **Thermostat ON** | **Thermostat OFF** | **Failure** |
| **Compressor** | ON | OFF | OFF |
| **Indoor fan motor** | ON | ON(HOT KEEP) | OFF |
| **Outdoor fan motor** | ON | OFF | OFF |
| **4-way valve** | ON | ON | OFF (3 minutes ON) |

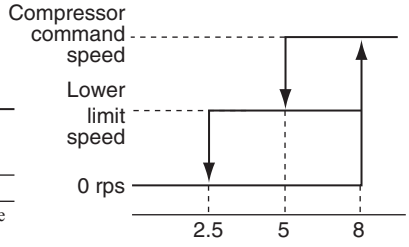
2) Operation of major functional components in Cooling mode

| | Cooling | | |
|---|---|---|---|
| | **Thermostat ON** | **Thermostat OFF** | **Failure** |
| **Compressor** | ON | OFF | OFF |
| **Indoor fan motor** | ON | ON | OFF |
| **Outdoor fan motor** | ON | OFF | OFF (few minutes ON) |
| **4-way valve** | OFF | OFF | OFF |

### (g) Frost prevention control

1) Operating conditions
a) Indoor heat exchanger temperature (Th2) is lower than 5ºC.
b) 5 minutes after reaching the compressor command speed except 0 rps.
2) Detail of anti-frost operation

| Indoor heat exchanger temperature / Item | **5°C or lower** | **2.5°C or lower** |
|---|---|---|
| **Lower limit speed** | 25 rps | 0rps |
| **Indoor fan** | Depends on operation mode | Protects the fan tap just before frost prevention control |
| **Outdoor fan** | Depends on operation mode | Depends on stop mode |
| **4-way valve** | OFF | |




Notes (1) When the indoor heat exchanger temperature is in the range of 2.5~5 ºC, the speed is reduced by 4 rps at each 20 seconds.
(2) When the temperature is lower than 2.5 ºC, the compressor is stopped.
(3) When the indoor heat exchanger temperature is in the range of 5~8 ºC, the compressor command speed is been maintained.

3) Reset conditions: When either of the following condition is satisfied.
   a) The indoor heat exchanger temperature (Th2) is 8ºC or higher.
   b) The compressor command speed is 0 rps.

### (h) Indoor fan motor protection

When the air conditioner is operating and the indoor fan motor is turned ON, if the indoor fan motor has operated at 300 rpm or under for more than 30 seconds, the unit enters first in the stop mode and then stops the entire system.

### (i) Serial signal transmission error protection

**(a) Purpose:** Prevents malfunction resulting from error on the indoor ↔ outdoor signals.

**(b) Detail of operation:** If the compressor is operating and a serial signal cannot be received from the indoor control with outdoor control having serial signals continues for 7 minute and 35 seconds, the compressor is stopped. After the compressor has been stopped, it will be restarted after the compressor start delay if a serial signal can be received again from the indoor control.

### (j) Plural unit control – Control of 16 units group by one remote controller

1) Function

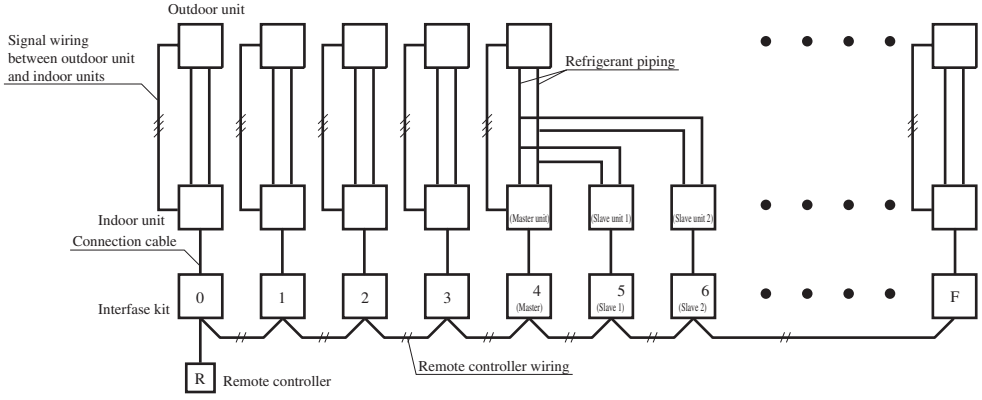
One remote controller switch can control a group of multiple number of unit (Max. 16 indoor units). "Operation mode" which is set by the remote controller switch can operate or stop all units in the group one after another in the order of unit No.(1). Thermostat and protective function of each unit function independently.

Note (1) Unit No. is set by SW1 on the interface PCB. Unit No. setting by SW1 is necessary for the interface only. In cases of the twin and triple specification, it is necessary set for the master and the slave units. This can be selected by SW3. (All are set for the master unit at the shipping from factory.)

SW1: For setting of 0 – 9, A – F
SW3: For setting of master and slave units
(See table shown at right.)

SW3 setting (For interface PCB)

| Switch / Unit | SW3-1 | SW3-2 |
|---|---|---|
| Master | OFF | OFF |
| Stave1 | OFF | ON |
| Stave2 | ON | OFF |




(2) Unit No. may be set at random unless duplicated, it should be better to set orderly like 0, 1, 2…, F to avoid mistake.

2) Display to the remote controller
   a) Center or each remote controller basis, heating preparation: the youngest unit No. among the operating units in the remote mode (or the center mode unless the remote mode is available) is displayed.
   b) Inspection display: Any of unit that starts initially is displayed.
   c) Confirmation of connected units
   Pressing "AIR CON No." button on the remote controller displays the indoor unit address. If "▲" "▼" button is pressed at the next, it is displayed orderly starting from the unit of youngest No.

d) In case of anomaly

i) If any anomaly occurs on a unit in a group (a protective function operates), that unit stops with the anomalous stop but any other normal units continue to run as they are.

ii) Signal wiring procedure

Signal wiring between indoor and outdoor units should be made on each unit same as the normal wiring. For the group control, lay connect with sires wiring between rooms using terminal blocks (X, Y) of interface kit.

Connect the remote controller communication wire separately from the power supply wire or wires of other electric devices (AC220V or higher).

### (k) Filter sign

As the operation time (Total ON time of ON/OFF switch) accumulates to 180 hours (1), "Filter cleaning" is displayed on the remote controller. (This is displayed when the unit is in trouble and under the centralized control, regardless of ON/OFF)

Note (1)Time setting for the filter sign can be made as shown below using the indoor function of wired remote controller "FILTER SIGN SET". (It is set at 1 at the shipping from factory.)

| Filter sign setting | Function |
|---|---|
| **Setting 1** | Setting time: 180 hrs (Factory default) |
| **Setting 2** | Setting time: 600 hrs |
| **Setting 3** | Setting time: 1,000 hrs |
| **Setting 4** | Setting time: 1,000 hrs (Unit stop) [2] |

(2) After the setting time has elapsed, the "FILTER CLEANING" is displayed and, after operating for 24 hours further (counted also during the stop), the unit stops.

## 1.4 Operation control function by the outdoor controller

### (1) Determination of compressor speed (frequency)

#### Required frequency

(a) Cooling/dehumidifying operation

Unit: rps

| Model | | 71 | 100 | 125 | 140 |
|---|---|---|---|---|---|
| Max. required frequency | Indoor unit air flow "P-Hi", "Hi" | 88 | 75 | 95 | 95 |
| | Indoor unit air flow "Me", "Lo" | 80 | 60 | 60 | 70 |
| Min. required frequency | | 20 | 20 | 20 | 20 |

(b) Heating operation

Unit: rps

| Model | | 71 | 100 | 125 | 140 |
|---|---|---|---|---|---|
| Max. required frequency | Indoor unit air flow "P-Hi", "Hi" | 112 | 120 | 120 | 120 |
| | Indoor unit air flow "Me", "Lo" | 90 | 60 | 70 | 70 |
| Min. required frequency | | 20 | 20 | 20 | 20 |

(c) If "Silent mode start" signal is received from the remote controller, the maximum required frequency becomes same as when the indoor air flow is set at "Lo".

(d) Max. required frequency under high outdoor air temperature in cooling mode
Maximum required frequency is selected according to the outdoor air temperature (Tho-A).

Unit: rps

| Model | | 71 | 100 | 125 | 140 |
|---|---|---|---|---|---|
| Max. required frequency | Outdoor air temperature is 40°C or higher | 76 | 75 | 75 | 75 |
| | Outdoor air temperature is 46°C or higher | 62 | 75 | 70 | 70 |

(e) Max. required frequency under outdoor air temperature in heating mode
Maximum required frequency is selected according to the outdoor air temperature (Tho-A).

Unit: rps

| Model | | 71 | 100 | 125 | 140 |
|---|---|---|---|---|---|
| Max. required frequency | Outdoor air temperature is 18°C or higher | 76 | 60 | 80 | 85 |

(f) Selection of max. required frequency by heat exchanger temperature

1) Maximum required frequency is selected according to the outdoor unit heat exchanger temperature (Tho-R) during cooling/dehumidifying or according to the indoor unit heat exchanger temperature (Thı-R) during heating mode.

2) When there are 3 indoor unit heat exchanger temperatures (Thı-R), whichever the highest applies,

Unit: rps

| Model | | | 71 | 100 | 125 | 140 |
|---|---|---|---|---|---|---|
| Max. required frequency | Cooling/ dehumidifying | Outdoor unit heat exchanger temperature is 56°C or higher | – | – | – | – |
| | Heating | Indoor unit heat exchanger temperature is 56°C or higher | – | 100 | 100 | 100 |

(g) When any of the controls from (a) to (f) above may duplicate, whichever the smallest value among duplicated controls is taken as the maximum required frequency.

(h) During heating, it is operated with the maximum required frequency until the indoor unit heat exchanger temperature becomes 40°C or higher.

### (2) Compressor start control

(a) Compressor starts upon receipt of the thermostat ON signal from the indoor unit.

(b) However, at initial start after turning the power supply breaker, it may enter the standby state for maximum 30 minutes (" PREPARATION" is displayed on the remote controller) in order to prevent the oil loss in the compressor.
If the cooling/dehumidifying/heating operation is selected from the remote controller when the outdoor unit is in the standby state, " PREPARATION" is displayed for 3 seconds on the remote controller.

### (3) Compressor soft start control

#### (a) Compressor protection start I

[Control condition] Normally, the compressor operation frequency is raised in this start pattern.

[Control contents] 1) Starts with the compressor's target frequency at **A** rps.
However, when the ambient air temperature (Tho-A) is 35°C or higher during cooling/dehumidifying or the indoor return air temperature (THI-A) is 25°C or higher during heating, it starts at **C** rps.

2) At 30 seconds after the start of compressor, its target frequency changes to **B** rps and the compressor is operated for 2 - 4 minutes with its operation frequency fixed at **B** rps.

| Model | Operation mode | **A** rps | **B** rps | **C** rps |
|---|---|---|---|---|
| 71 | Cooling/Dehumidifying | 42 | 42 | 40 |
| | Heating | 62 | 62 | 40 |
| 100 | Cooling/Dehumidifying | 55 | 55 | 30 |
| | Heating | 55 | 55 | 30 |
| 125, 140 | Cooling/Dehumidifying | 45 | 45 | 25 |
| | Heating | 45 | 45 | 25 |

#### (b) Compressor protection start III

[Control condition] Number of compressor starts is only 1 counted after the power supply breaker ON.

[Control contents] Operates by selecting one of following start patterns according to the operation mode and the outdoor air temperature (Tho-A).

1) Low frequency operation control during cooling/dehumidifying

[Control condition] Upon establishing the conditions of compressor protection start III, the low frequency operation control is performed during cooling/dehumidifying.

[Control contents] a) Starts with the compressor's target frequency at **A** rps. When the outdoor air temperature (Tho-A) is 35°C or higher, it starts at **C** rps.

b) At 30 seconds after the compressor start, the compressor's target frequency is changed to **B** rps and the compressor's operation frequency is fixed for 10 minutes.

| Model | Operation mode | **A** rps | **B** rps | **C** rps |
|---|---|---|---|---|
| 71 | Cooling/Dehumidifying | 42 | 42 | 40 |
| 100 | Cooling/Dehumidifying | 55 | 55 | 30 |
| 125, 140 | Cooling/Dehumidifying | 45 | 45 | 25 |

2) Low frequency operation control during heating

[Control condition] When the conditions of compressor protection start III are established and one of following conditions a) and b) is satisfied, the low number of revolutions operation control is performed during heating.

a) At 30 minutes or more after turning the power supply breaker on

b) Compressor underneath temperature (Tho-H) is 4°C or higher and the difference from the outdoor air temperature (Tho-A) becomes 4°C or higher. [model 200, 250 only]

[Control contents] a) Starts the compressor with its target frequency at **A** rps. However, when the indoor unit return air temperature (THI-A) is 25°C or higher, it start at **C** rps.

b) At 30 seconds after the start of compressor, the compressor's target frequency is changed to **B** rps and the compressor's operation frequency is fixed for 10 minutes.

| Model | Operation mode | **A** rps | **B** rps | **C** rps |
|---|---|---|---|---|
| 71 | Heating | 42 | 42 | 40 |
| 100 | Heating | 55 | 55 | 30 |
| 125, 140 | Heating | 45 | 45 | 25 |

### (4) Outdoor unit fan control

#### (a) Outdoor unit fan tap and fan motor speed

Unit: $min^{-1}$

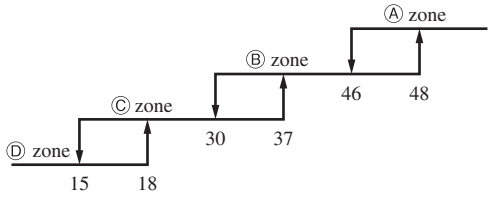
| Model | Mode | Fan motor tap | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 71 | | ① speed | ② speed | ③ speed | ④ speed | ⑤ speed | ⑥ speed | ⑦ speed |
| | Cooling/Dehumidifying | 200 | 400 | 600 | 710 | 810 | 850 | 950 |
| | Heating | 200 | 400 | 600 | 710 | 810 | 850 | 950 |
| 100 | | ① speed | ② speed | ③ speed | ④ speed | ⑤ speed | ⑥ speed | ⑦ speed |
| | Cooling/Dehumidifying | 200 | 350 | 600 | 740 | 820 | 870 | 950 |
| | Heating | 200 | 350 | 600 | 740 | 820 | 870 | 950 |
| 125, 140 | | ① speed | ② speed | ③ speed | ④ speed | ⑤ speed | ⑥ speed | ⑦ speed |
| | Cooling/Dehumidifying | 200 | 370 | 560 | 640 | 745 | 870 | 910 |
| | Heating | 200 | 370 | 560 | 640 | 800 | 870 | 910 |

#### (b) Fan tap control during cooling/heating operation

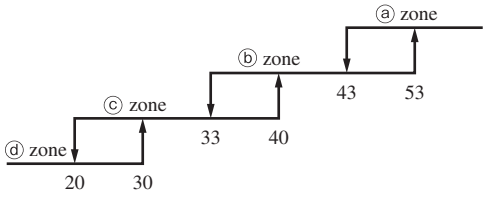
Fan taps are selected depending on the outdoor unit heat exchanger temperature (Tho-R1, R2) and the outdoor air temperature (Tho-A).
Note (1) It is detected by Tho-R1 or R2, whichever the higher.

| | Ⓐ zone | Ⓑ zone | Ⓒ zone | Ⓓ zone |
|---|---|---|---|---|
| ⓐ zone | Tap 5(6) | Tap 5(6) | Tap 5(6) | Tap 4 |
| ⓑ zone | Tap 5(6) | Tap 5(6) | Tap 4(6) | Tap 3 |
| ⓒ zone | Tap 4 | Tap 4 | Tap 3 | Tap 2 |
| ⓓ zone | Tap 3 | Tap 3 | Tap 2 | Tap 1 |

Note (1) Value in ( ) are for the model 71.




Outdoor air temp. (˚C)



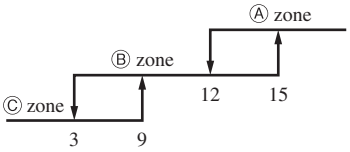

Outdoor unit heat exchanger temp. (˚C)

#### (c) Fan tap control during heating operation

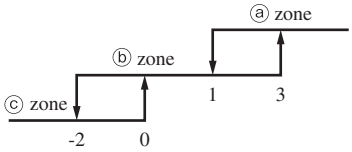
Fan taps are selected depending on the outdoor unit heat exchanger temperature (Tho-R1, R2) and the outdoor air temperature (Tho-A).
Note (1) It is detected by Tho-R1 or R2, whichever the lower.

| | Ⓐ zone | Ⓑ zone | Ⓒ zone |
|---|---|---|---|
| ⓐ zone | Tap 3 | Tap 3 | Tap 4 |
| ⓑ zone | Tap 3 | Tap 4(5) | Tap 5 |
| ⓒ zone | Tap 4 | Tap 5 | Tap 6 |

Note (1) Value in ( ) are for the model 71.




Outdoor air temp. (˚C)

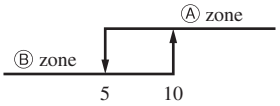



Outdoor unit heat exchanger temp. (˚C)

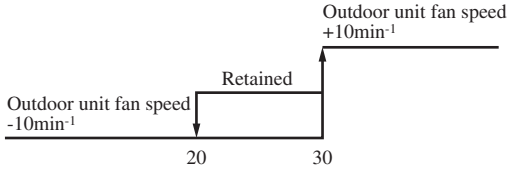
#### (d) Outdoor unit fan control at cooling low outdoor air

1) When all the following conditions are established after the start of compressor, the following control is implemented. If the outdoor air temperature (Tho-A) is in the zone Ⓑ in the cooling/dehumidifying mode, it has elapsed 20 seconds from the start of outdoor unit fan and the outdoor unit fan is at the tap 1 speed, the outdoor unit fan speed is controlled according to the outdoor unit heat exchanger temperature (Tho-R1, R2).

Note (1) It is detected with Tho-R1 or R2, whichever the higher.




Outdoor air temp. (˚C)




Outdoor unit heat exchanger temp. (˚C)

2) The outdoor unit heat exchanger temperature is detected always and, when the number of revolutions of the outdoor fan speed has been increased or decreased, there is no change of fan speed for 20 seconds.
3) Rage of the outdoor unit fan speed under this control is as follows.
   a) Lower limit: 130rpm
   b) Upper limit: 500rpm
4) As any of the following conditions is established, this control terminates.
   a) When the outdoor air temperature is in the zone Ⓐ and the outdoor unit heat exchanger temperature at 30°C or higher is established for 40 seconds or more continuously.
   b) When the outdoor fan speed is 500rpm and the outdoor unit heat exchanger temperature at 30°C or higher is established for 40 seconds or more continuously.
   c) When the outdoor unit heat changer temperature at 45°C or higher is established for 40 seconds or more.

**(e) Outdoor unit fan control by the power transistor radiator fin temperature**

When all the following conditions are established later than 3 minutes after the start of compressor, the following control is implemented.

1) Cooling/dehumidifying
   a) Outdoor air temperature Tho-A ≧ 33°C
   b) Compressor's actual frequency ≧ **A** rps
   c) Power transistor radiator fin temperature ≧ **C** °C
2) Heating
   a) Outdoor air temperature Tho-A 16°C
   b) Compressor's actual frequency ≧ **B** rps
   c) Power transistor radiator fin temperature ≧ **C** °C
3) Control contents
   a) Raises the outdoor unit fan tap by 1 tap.
   b) When the sampling is for 60 minutes and the value of power transistor radiator fin temperature (Tho-P) is as follows.
   ① When the power transistor radiator fin temperature (Tho-P) ≧ **C** °C, the outdoor unit fan tap is raised by 1 speed further.
   ② When **C** °C > power transistor radiator fin temperature (Tho-P) ≧ **D** °C, present outdoor unit fan tap is maintained.
   ③ When the power transistor radiator fin temperature (Tho-P) ≧ **D** °C, the outdoor unit fan tap is dropped by 1 speed.
4) Ending conditions

   When the operation under the condition of item b), ③ above and with the outdoor unit fan tap, which is determined by the item (b) is detected 2 times consecutively.

   • Compressor's frequency and power transistor radiator fin temperature

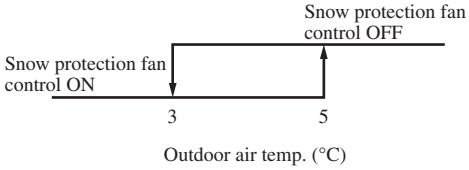
| Item / Model | A | B | C | D |
|---|---|---|---|---|
| 71 | 60 | 70 | 80 | 75 |
| 100 | 85 | 85 | 72 | 68 |
| 125, 140 | 65 | 65 | 72 | 68 |

**(f) Caution at the outdoor unit fan start control**

When the outdoor unit fan is running at 400min$^{-1}$ before operating the compressor, it may operate with the compressor only, without starting up the outdoor fan This is normal.

**(g) Snow protection fan control**

If the dip switch (SW3-2) on the outdoor unit control PCB is turned ON, the outdoor unit fan is operated for 30 seconds at 4 tap speed once in every 10 minutes depending on the outdoor air temperature (detected with Tho-A) in the stop mode or anomalous stop mode.

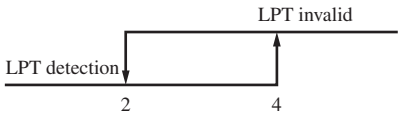


## (5) Defrosting

### (a) Defrosting start conditions

If all of the following defrosting conditions A or conditions B are met, the defrosting operation starts.

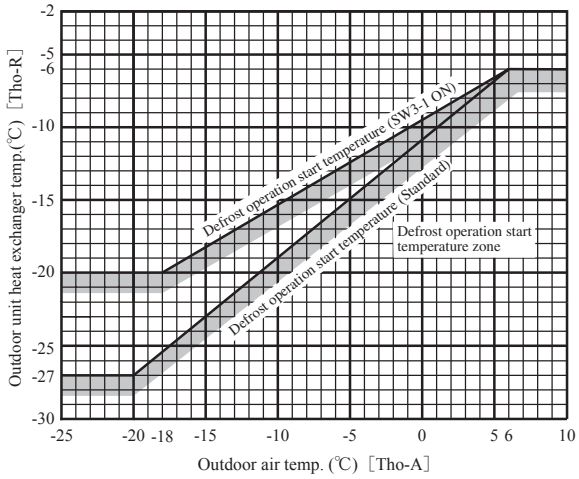
1) Defrosting conditions A
   a) Cumulative compressor operation time after the end of defrosting has elapsed 37 [45] minutes, and the cumulative compressor operation time after the start of heating operation (remote controller ON) has elapsed 30 minutes.
   b) After 5 minutes from the compressor ON
   c) After 5 minutes from the start of outdoor unit fan
   d) After satisfying all above conditions, if temperatures of the outdoor unit heat exchanger temperature thermistor (Tho-R1, R2) and the outdoor air temperature thermistor (Tho-A) become lower than the defrosting start temperature as shown by the right figure for 15 seconds continuously, or the suction gas saturation temperature (SST) and the outdoor air temperature (Tho-A), which are obtained from the value detected by the low pressure sensor (LPT) stay for 3 minutes within the range below the defrosting operation start temperature as shown by the right figure. However, it excludes for 10 minutes after the start of compressor and the outdoor air temperature is as shown by the lower figure.



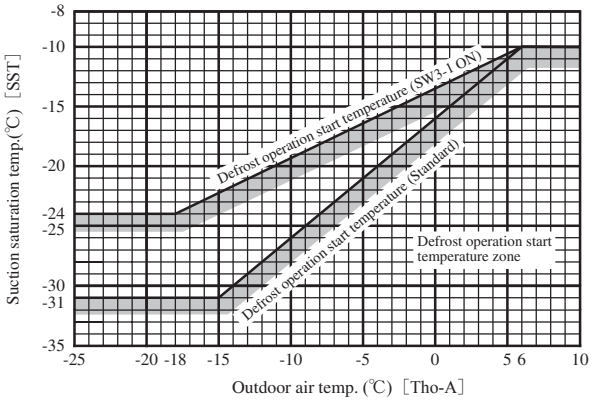

Note (1) Figures in [ ] are for model 71.

2) Defrosting conditions B
   a) When previous defrosting end condition is the time out of defrosting operation and it is in the heating operation after the cumulative compressor operation time after the end of defrosting has become 30 minutes.
   b) After 5 minutes from the start of compressor
   c) After 5 minutes from the start of outdoor unit fan

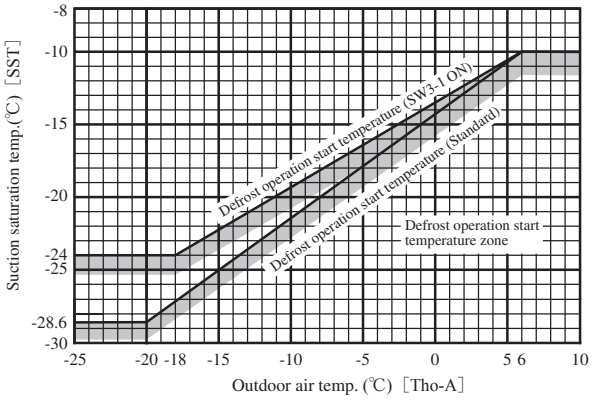
**Model 71 ~ 140**




**Model 71**




**Model 100 ~ 140**




### (b) Defrosting end conditions

When any of the following conditions is satisfied, the defrosting end operation starts.

1) When it has elapsed 8 minutes and 20 seconds after the start of defrosting. (After 10 minutes and 20 seconds for model 71)
2) When the outdoor unit heat exchanger temperatures (Tho-R1, R2), whichever the lower, becomes 12°C or higher for 10 seconds continuously.

### (c) Switching of defrosting control with SW3-1

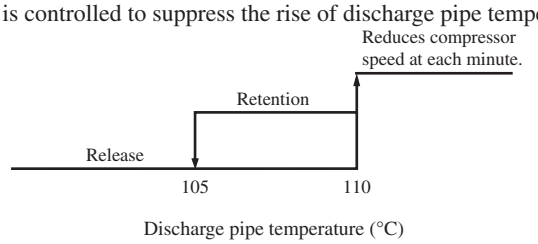
1) If SW3-1 on the outdoor unit control PCB is turned to ON, it becomes easier to enter the defrosting operation. Use this when installing a unit at snowing regions.
2) Control contents
   a) It allows entering the defrosting operation under the defrosting condition A when the cumulative heating operation time becomes 30 minutes. It is 37 [45] minutes at SW3-1 OFF (Factory default).
   b) It allows entering the defrosting operation under the defrosting condition B when the cumulative heating operation time becomes 25 minutes. It is 30 minutes at SW3-1 OFF (Factory default).
   c) It allows the defrosting operation with the outdoor unit heat exchanger temperature (Tho-R) and suction pressure saturation temperature (SST) being higher than normal.

Note (1) Figures in [ ] are for model 71.

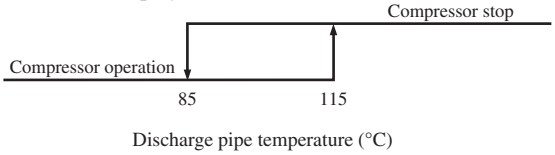
## (6) Protective control/anomalous stop control by compressor's number of revolutions

### (a) Compressor discharge pipe temperature protection

1) Protective control
As the discharge pipe temperature (detected with Tho-D) exceeds the setting value, the compressor speed (frequency) is controlled to suppress the rise of discharge pipe temperature.



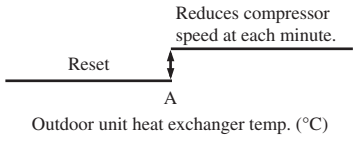

2) Anomalous stop control
   a) If the discharge pipe temperature (detected with Tho-D) exceeds the setting value, the compressor stops.
   b) When it is detected 2 times within 60 minutes or after continuous 60 minutes, including the stop of compressor, E36 is displayed on the remote controller and it enters the anomalous stop mode.




3) Reset of anomalous stop mode
As it drops to the reset value of 85°C or lower for 45 minutes continuously, it becomes possible to restart from the remote controller.

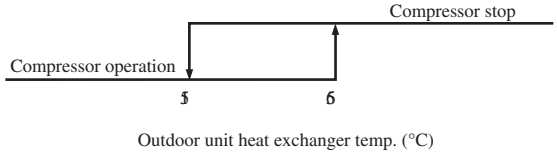
### (b) Cooling high pressure protection

1) Protective control
   a) When the outdoor air temperature (Tho-A) is 40°C or higher and the outdoor unit heat exchanger temperature (Tho-R) exceeds the setting value, the compressor speed (frequency) is controlled to suppress the rise of high pressure.
   b) Control value A is updated to an optimum value automatically according to the operating conditions.




| Control value A |
|---|
| 54~60°C |

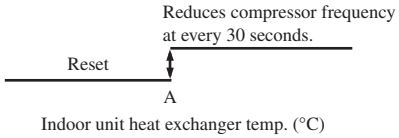
2) Anomalous stop control
   a) As the outdoor unit heat exchanger temperature (Tho-R) exceeds the setting value, the compressor stops.
   b) If it is detected 5 times within 60 minutes or 65°C or higher continues for 60 minutes, including the stop of compressor, E35 is displayed on the remote controller and it enters the anomalous stop mode.




3) Reset of anomalous stop mode
As it reaches the reset value of 51°C or lower, it becomes possible to restart from the remote controller.

### (c) Heating high pressure protection

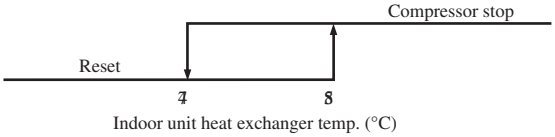
1) Protective control
   a) As the indoor unit heat exchanger temperature (Thı-R) exceeds the setting value, the compressor speed (frequency) is controlled to suppress the rise of high pressure.
   b) Control value A is updated to an optimum value automatically according to the operating conditions.




| Model | Existing piping adaptation switch: SW5-1 (SW8-1: model 80) | |
|---|---|---|
| | OFF (Shipping) | ON |
| | Control value A (°C) | |
| 71 | 52~58 | 46~52 |
| 100~140 | 48~54 | |

Note (1) Adaptation to existing piping is at ON.

2) Anomalous stop control
   Operation control function by the indoor unit controller - See the heating overload protection, page 10.
3) Adaptation to existing piping, stop control
   If the existing piping adaptation switch, SW5-1 (SW8-1: 71 type), is turned ON, the compressor stops to protect existing piping when the indoor unit heat exchanger temperature (Thı-R) exceeds the setting value.

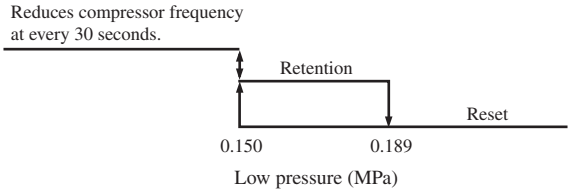



### (d) Anomaly detection control by the high pressure switch (63H1)

1) If the pressure rises and operates the high pressure switch (opens at 4.15MPa/closes at 3.15MPa), the compressor stops.
2) Under any of the following conditions, E40 is displayed and it enters the anomalous stop mode.
   a) When it occurs 5 times within 60 minutes that pressure rises and the compressor is stopped by 63H1.
   b) When 63H1 has been in the open state for 60 minutes continuously, including the stop of compressor.

### (e) Low pressure control

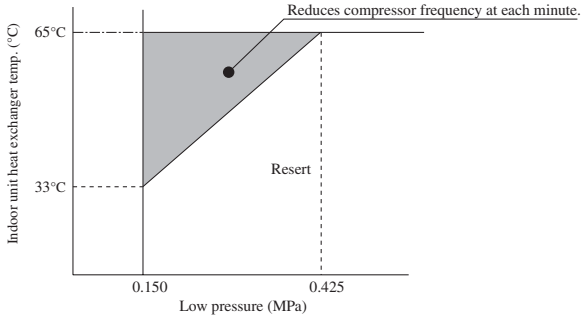
1) Protective control
   If the value detected by the low pressure sensor (LPT) exceeds the setting value, the compressor speed (frequency) is controlled to restrain the drop of pressure.




2) Anomalous stop control
   a) When a value detected by the low pressure sensor (LPT) satisfies any of the following conditions, the compressor stops to run for its protection.
      ① When the low pressure drops to 0.079MPa or under for 15 seconds continuously.
      ② At 10 minutes after the start of compressor, the suction overheat becomes 30°C and the low pressure becomes 0.15MPa or under for 60 seconds continuously.
   b) E49 is displayed under any of the following conditions and it enters the anomalous stop mode.
      ① When the low pressure drops 3 times within 60 minutes and the compressor stops under any of the above conditions.
      ② When a value detected with the low pressure sensor becomes 0.079MPa or under for 5 minutes, including the stop of compressor.
   c) However, when the control condition a). ① is established during the compressor protection start III, E49 is displayed at initial stop and it enters the anomalous stop mode.

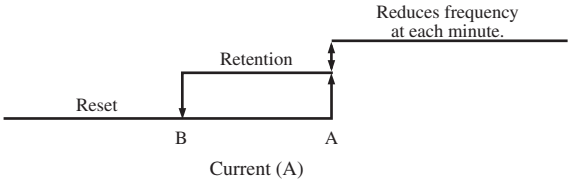
### (f) Compressor pressure ratio protection control

1) During heating operation, if the indoor unit heat exchanger temperature (Thı-R) and the outdoor unit heat exchanger temperature (Tho-R) exceed the setting values at 10 minutes after the start of compressor, the compressor speed (frequency) is controlled to protect the compressor.
2) This control is not performed during the outdoor fan ON and for 10 minutes from the start of outdoor unit fan.
3) This control is not performed during defrosting operation and at 10 minutes after the reset of defrosting operation.
4) When there are 3 indoor unit heat exchanger temperatures (Thı-R), the highest temperature is detected.



### (g) Over-current protection current safe controls I, II

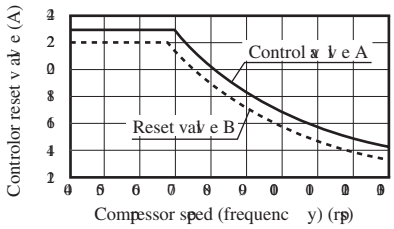
Detecting the outdoor unit inverter input (primary) current and the output (secondary) current, if the current values exceed setting values, the compressor speed (frequency) is controlled to protect the inverter.




| Model | | Cooling | | Heating | |
|---|---|---|---|---|---|
| | | Control value A | Reset value B | Control value A | Reset value B |
| Primary current side | 71 | 15.0 | 14.0 | 16.0 | 15.0 |
| | 100 | 13.5 (23.0) | 12.5 (22.0) | 13.5 (23.0) | 12.5 (22.0) |
| | 125, 140 | 11.0 (23.0) | 10.0 (22.0) | 11.0 (25.0) | 10.0 (24.0) |
| Secandary current side | 71 | 13.0 | 12.0 | 13.0 | 12.0 |
| | 100 | 11.5 (Fig.C) | 10.5 (Fig.C) | 11.5 (Fig.C) | 10.5 (Fig.C) |
| | 125, 140 | 11.5 (Fig.C) | 10.5 (Fig.C) | 11.5 (Fig.C) | 10.5 (Fig.C) |

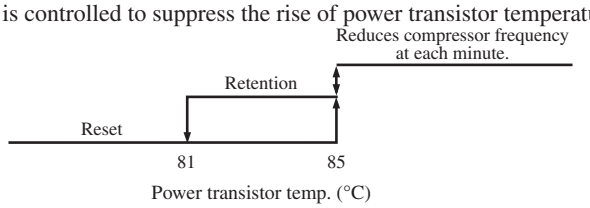
Note (1) Value in ( ) are for the single phase models.

(Fig.C) The control value "A" and the reset value vary depending on the compressor speed.




### (h) Power transistor temperature protection

1) Protective control
If the power transistor temperature (detected with TIP) exceeds the setting value, the compressor speed (frequency) is controlled to suppress the rise of power transistor temperature.




### (i) Anomalous power transistor current

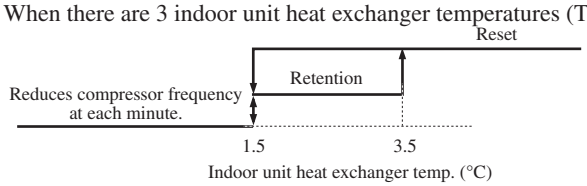
1) Prevents over-current on the inverter. If the current value in the power transistor exceeds the setting value, the compressor stops.
2) If the current value in the power transistor exceeds the specified value and the compressor stops 4 times within 30 minutes, E42 is displayed on the remote controller and it enters the anomalous stop mode.

### (j) Anomalous inverter PCB

If the power transistor detects any anomaly for 15 minutes, including the stop of compressor, E51 is displayed on the remote controller and it enters the anomalous stop mode.

### (k) Anti-frost control by the compressor frequency control

1) If the indoor unit heat exchanger temperature (detected with Thı-R) exceeds the setting value at 4 minutes after the start of compressor, the compressor speed (frequency) is controlled to initiate the anti-frost control of indoor unit heat exchanger.
2) When there are 3 indoor unit heat exchanger temperatures (Thı-R), the lowest temperature is detected.




3) Regarding the anti-frost control by the operation stop, refer to the operation control function by the indoor unit controller and the cooling, dehumidifying frost prevention of page 10.

**(l) Dewing prevention control**

[Control condition] During cooling and dehumidifying operation, if all the following conditions are established, the compressor speed (frequency) is reduced to prevent dewing and water splash.

① Cooling electronic expansion valve aperture (EEVC) is 500 pulses.

② Suction overheat is 10°C or higher.

③Compressor speed (frequency) is **A** rps or higher.

[Control contents] ① When the suction overheat is 10°C or higher, the compressor speed (frequency) is reduced at each 1 minute.

② Compressor speed (frequency) does not rise till the cooling expansion valve becomes 460 pulses.

③ This control takes **A** rps as its lower limit so that compressor speed is not controlled when it is less than **A** rps.

| Model | **A** rps |
|---|---|
| 71 | 42 |
| 100~140 | 60 |

**(m) Refrigerant quantity shortage protection**

Under the compressor protection start III control during cooling and dehumidifying operations, the following control is performed by detecting the indoor unit heat exchanger temperature (Thı-R) and the indoor unit return air temperature (Thı-A).

[Control condition] When the state that the indoor unit heat exchanger temperature (Thı-R) does not become lower than the indoor unit return air temperature (Thı-A) by 4°C or more continues for 1 minute.

[Control contents] It judges that the flowing of refrigerant in to the indoor unit is insufficient so that the compressor is stopped and E57 is displayed on the remote controller.

**(n) Broken wire detection on temperature thermistor and low pressure sensor**

1) Outdoor unit heat exchanger thermistor, outdoor air thermistor and low pressure sensor
If the following is detected for 5 second continuously within 2 minutes to 2 minutes and 20 seconds after the compressor ON, the compressor stops. After a delay of 3 minutes, it restarts but, if the same is detected repeatedly 3 times within 40 minutes, the compressor stops with the anomalous stop.
Note (1) During defrosting and for 3 minutes after the end of defrosting, it is not detected.
- Outdoor unit heat exchanger thermistor: -50°C or lower
- Outdoor air temperature thermistor: -45 or lower
- Low pressure sensor: 0V or under or 4.0V or over

2) Discharge pipe temperature thermistor, suction pipe temperature thermistor
If the following is detected for 5 second continuously within 10 minutes to 10 minutes and 20 seconds after the compressor ON, the compressor stops. After a delay of 3 minutes, it restarts but, if the same is detected repeatedly 3 times within 40 minutes, the compressor stops with the anomalous stop.
Note (1) During defrosting and for 3 minutes after the end of defrosting, it is not detected.
- Discharge pipe temperature thermistor: -10°C or lower
- Suction pipe temperature thermistor: -50 or lower

**(o) Open phase protection (3-phase models only)**

When 0V is detected on any of L1, L2 or L3 phase for 5 seconds continuously after the power ON, it judges the state of open phase on the power supply and activates the anomalous stop (E34) 1 second later.

**(p) Fan motor error**

1) If the fan speed of 100rpm or under is detected for 30 second continuously under the outdoor unit fan control (with the operation command of fan tap at ① speed or higher), the compressor stops.
2) When the fan motor speed drops to 100rpm or under 5 times within 60 minutes and the compressor stops, it enters the anomalous stop mode with E48 displayed on the remote controller.

**(q) Anomalous stop by the compressor start stop**

1) When it fails to shift to the compressor DC motor's rotor position defection operation at 5 seconds after establishing the compressor start condition, the compressor stops temporarily and restarts 3 minutes later.
2) If it fails to shift to the position detection operation again at second time, it judges the anomalous compressor start and stops the compressor by the anomalous stop (E59).

### (7) Silent mode

(a) As "Silent mode start" signal is received from the remote controller, it operates by dropping the outdoor unit fan tap and the compressor speed (frequency).

(b) For details, refer to items (1) and (4) above.

### (8) Test run

#### (a) It is possible to operate from the outdoor unit using the dip switch on the outdoor unit control PCB.

| | | | | |
|---|---|---|---|---|
| SW3-3 (SW5-3) | ON | SW3-4 (SW5-4) | OFF | Cooling test run |
| | | | ON | Heating test run |
| | OFF | Normal and end of test run | | |

Make sure to turn SW3-3 (SW5-3) to OFF after the end of operation.

Note (1) Value in ( ) are for the model 71.

#### (b) Test run control

1) Operation is performed at the maximum compressor speed (frequency), which is determined for each model.
2) Each protective control and error detection control are effective.
3) If SW3-4 (SW5-4) is switched during test run, the compressor is stoped for once by the stop control and the cooling/heating operation is switched.
   Note (1) Value in ( ) are for the model 71.
4) Setting and display of remote controller during test run

| Item / Mode | Contents of remote controller setting/display |
|---|---|
| Cooling test run | Setting temperature of cooling is 5°C. |
| Heating test run | Setting temperature of heating (preparation) is 30°C. |

### (9) Pump-down control

Turning ON the pump-down switch SW1 (SW9) for 2 seconds during the operation stop or anomalous stop (excluding the thermostat OFF), the pump-down operation is performed. (This is invalid when the indoor unit is operating. This is effective even when the indoor unit is stopped by the anomalous stop or the power supply is turned OFF.)

Note (1) Value in ( ) are for the model 71.

#### (a) Control contents

1) Close the operation valve at the liquid side. (It is left open at the gas side.)
2) Compressor is started with the target speed (frequency) at 71:62, 100:55, 125•140:45 rps in the cooling mode.
3) Red and green lamps (LED) flash continuously on the outdoor unit control PCB.
4) Each of protection and error detection controls, excluding the low pressure control, anti-frost control and dewing prevention control, is effective.
5) Outdoor unit fan is controlled as usual.
6) Electronic expansion valve is fully opened.

#### (b) Control ending conditions

Stop control is initiated depending on any of the following conditions.

1) Low pressure of 0.087MPa or lower is detected for 5 seconds continuously.
   a) Red LED: Light, Green LED: Flashing, Remote controller: Displays stop.
   b) It is possible to restart when the low pressure is 0.087MPa or higher.
   c) Electronic expansion valve (cooling/heating) is kept fully open.
2) Stop by the error detection control
   a) Red LED: Flashing, Green LED: Flashing
   b) Restart is prohibited. To return to normal operation, reset the power supply.
   c) Electronic expansion valve (cooling/heating) is left fully open.
3) When the cumulative operation time of compressor under the pump-down control becomes 5 minutes.
   a) Red LED: OFF, Green LED: Flashing, Remote controller: Stop
   b) It is possible to pump-down again.
   c) Electronic expansion valve (cooling/heating) is left fully open.

   Note (1) After the stop of compressor, close the operation valve at the gas side.

Caution: Since pressing the pump-down switch cancels communications with the indoor unit, the indoor unit and the remote controller display "Transmission error – E5". This is normal.

**(j) Drain pan ON/OFF output control (optional) (Models 100 ～ 140 only)**

**1) Drain pan heater ON conditions**

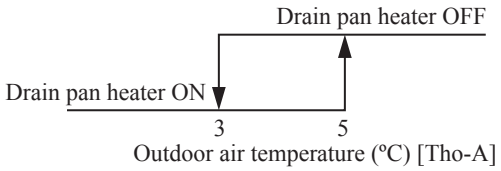
When all of following conditions are met, the drain pan heater is turned ON.

- Outdoor air temperature (detected with Tho-A) is 3ºC or lower.
- In the heating mode
- When the compressor is turned ON

**2) Drain pan heater OFF conditions**

When either one of following conditions is met, the drain pan heater is turned OFF.

- Outdoor air temperature (detected with Tho-A) is 5ºC or higher.
- When the compressor stop has been detected for 30 minutes continuously
- In the cooling or dehumidifying mode



# 2. MAINTENANCE DATA

## 2.1 Diagnosing of microcomputer circuit

### (1) Selfdiagnosis function

#### (a) Check Indicator Table

Whether a failure exists or not on the indoor unit and outdoor unit can be know by the contents of remote controller error code, indoor/outdoor unit green LED (power pilot lamp and microcomputer normality pilot lamp) or red LED (check pilot lamp).

#### (i) Indoor unit

| Remote controller | | Indoor control PCB | | Outdoor control PCB | | Location of trouble | Description of trouble | Repair method | Reference page |
|---|---|---|---|---|---|---|---|---|---|
| Error code | Red LED | Red LED | Green LED (1) | Red LED | Green LED (1) | | | | |
| No-indication | Stays OFF | Stays OFF | Keeps flashing | Stays OFF | Keeps flashing | — | • **Normal operation** | — | — |
| | | Stays OFF | Stays OFF | 2 times flash | Stays OFF | Indoor unit power supply | • Power OFF, broken wire/blown fuse, broken transformer wire | Repair | 62 |
| | | * 3 times flash | Keeps flashing | Stays OFF | Keeps flashing | Remote controller wires | • Poor connection, breakage of remote controller wire * For wire breaking at power ON, the LED is OFF. | Repair | 63 |
| | | | | | | Remote controller | • Defective remote controller PCB | Replacement of remote controller | |
| WAIT or INSPECT I/U | | Stays OFF | Keeps flashing | 2 times flash | Keeps flashing | Indoor-outdoor units connection wire | • Poor connection, breakage of indoor-outdoor units connection wire | Repair | 64 ～ 68 |
| | | | | | | Remote controller | • Improper setting of master and slave by remote controller | | |
| E1 | Keeps flashing | Stays OFF | * Keeps flashing | Stays OFF | Keeps flashing | Remote controller wires (Noise) | • **Poor connection of remote controller signal wire (White)** * For wire breaking at power ON, the LED is OFF • **Intrusion of noise in remote controller wire** | Repair | 70 |
| | | | | | | Remote controller indoor control PCB | *• Defective remote controller or indoor control PCB (defective communication circuit)? | Replacement of remote controller or PCB | |
| E5 | | 2 times flash | Keeps flashing | 2 times flash | Keeps flashing | Indoor-outdoor units connection wire | • **Poor connection of wire between indoor-outdoor units during operation (disconnection, loose connection)** • **Anomalous communication between indoor-outdoor units by noise, etc.** | Repair | 71 |
| | | 2 times flash | Keeps flashing | Stays OFF | Keeps flashing | (Noise) | • **CPU-runaway on outdoor control PCB** | Power reset or Repair | |
| | | | | | | Outdoor control PCB | *• Occurrence of defective outdoor control PCB on the way of power supply (defective communication circuit)? | Replacement of PCB | |
| | | 2 times flash | Keeps flashing | Stays OFF | Stays OFF | Outdoor control PCB | • **Defective outdoor control PCB on the way of power supply** | Replacement | |
| | | | | | | Fuse | • **Blown fuse** | | |
| E6 | | 1 time flash | Keeps flashing | Stays OFF | Keeps flashing | Indoor heat exchanger temperature thermistor | • **Defective indoor heat exchanger temperature thermistor** (defective element, broken wire, short-circuit) • Poor contact of temperature thermistor connector | Replacement, repair of temperature thermistor | 72 |
| | | | | | | Indoor control PCB | *• **Defective indoor control PCB (Defective temperature thermistor input circuit)?** | Replacement of PCB | |
| E7 | | 1 time flash | Keeps flashing | Stays OFF | Keeps flashing | Indoor return air temperature thermistor | • **Defective indoor return air temperature thermistor** (defective element, broken wire, short-circuit) • Poor contact of temperature thermistor connector | Replacement, repair of temperature thermistor | 73 |
| | | | | | | Indoor control PCB | *• **Defective indoor control PCB (Defective temperature thermistor input circuit)?** | Replacement of PCB | |
| E8 | | 1 time flash | Keeps flashing | Stays OFF | Keeps flashing | Installation or operating condition | • **Heating over-load** (Anomalously high indoor heat exchanger temperature) | Repair | 74 |
| | | | | | | Indoor heat exchanger temperature thermistor | • **Defective indoor heat exchanger temperature thermistor (short-circuit)** | Replacement of temperature thermistor | |
| | | | | | | Indoor control PCB | *• **Defective indoor control PCB** (Defective temperature thermistor input circuit)? | Replacement of PCB | |
| E9 | | 1 time flash | Keeps flashing | Stays OFF | Keeps flashing | Drain trouble | • **Defective drain pump (DM), broken drain pump wire**, disconnected connector | Replacement, repair of DM | 75 |
| | | | | | | Float switch | • **Anomalous float switch operation** (malfunction) | Repair | |
| | | | | | | Indoor control PCB | *• **Defective indoor control PCB** (Defective float switch input circuit) *• **Defective indoor control PCB** (Defective DM drive output circuit)? | Replacement of PCB | |
| | | | | | | Option | • **Defective optional parts** (At optional anomalous input setting) | Repair | |
| E10 | | Stays OFF | Keeps flashing | Stays OFF | Keeps flashing | Number of connected indoor units | • **When multi-unit control by remote controller is performed, the number of units is over** | Repair | 76 |
| E14 | | 3 times flash | Keeps flashing | Stays OFF | Keeps flashing | Indoor unit No. setting | •No master is assigned to slaves. | Repair | 77 |
| | | | | | | Remote controller wires | •Anomalous remote controller wire connection, broken wire between master and slave units | | |
| E16 | | Stays OFF | Keeps flashing | Stays OFF | Keeps flashing | Fan motor | • **Defective fan motor** —(In case of FDTC, FDT, SRK)— | Replacement, repair | 78 |
| | | | | | | Indoor control PCB | • **Defective indoor control PCB** | Replacement | |
| E19 | | 1 time flash | Keeps flashing | Stays OFF | Keeps flashing | Indoor control PCB | • **Improper operation mode setting** | Repair | 79 |
| E28 | | Stays OFF | Keeps flashing | Stays OFF | Keeps flashing | Remote controller temperature thermistor | • Broken wire of remote controller temperature thermistor | Repair | 80 |

Note (1) **Normal indicator lamp (Indoor, outdoor units: Green) extinguishes (or lights continuously) only when CPU is anomalous. It keeps flashing in any trouble other than anomalous CPU.**

(2) * mark in the Description of trouble means that, in ordinary diagnosis, it cannot identify the cause definitely, and, if the trouble is repaired by replacing the part, it is judged consequently that the replaced part was defective.

## (ii) Outdoor unit

| Remote controller | | Indoor control PCB | | Outdoor control PCB | | Outdoor inventer PCB | Location of trouble | Description of trouble | Repair method | Reference page |
|---|---|---|---|---|---|---|---|---|---|---|
| Error code | Red LED | Red LED | Green LED (1) | Red LED | Green LED (1) | Yellow LED | | | | |
| E34 | Keeps flashing | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | Keeps flashing | Power supply wires | • Outdoor unit power supply L3-phase interruption, defective noise filter (3-phase model only) | Repair | 81 |
| | | | | | | | Outdoor control PCB | *• Defective outdoor control PCB (Defective power supply input circuit)? (3-phase model only) | Replacement of PCB | |
| E35 | | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | | Installation or operating condition | • Higher outdoor heat exchanger temperature | Repair | 82 |
| | | | | | | | Outdoor heat exchanger temperature thermistor | • Defective outdoor heat exchanger temperature thermistor | Replacement of temperature thermistor | |
| | | | | | | | Outdoor control PCB | *• Defective outdoor control PCB (Defective temperature thermistor input circuit)? | Replacement of PCB | |
| E36 | | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | | Installation or operating condition | • Higher discharge temperature | Repair | 83 |
| | | | | | | | Discharge pipe temperature thermistor | • Defective discharge pipe temperature thermistor | Replacement, repair of temperature thermistor | |
| | | | | | | | Outdoor control PCB | *• Defective outdoor control PCB (Defective temperature thermistor input circuit)? | Replacement of PCB | |
| E37 | | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | | Outdoor heat exchanger temperature thermistor | • Defective outdoor heat exchanger temperature thermistor, broken wire or poor connector connection | Replacement, repair of temperature thermistor | 84 |
| | | | | | | | Outdoor control PCB | *• Defective outdoor control PCB (Defective temperature thermistor input circuit)? | Replacement of PCB | |
| E38 | | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | | Outdoor air temperature thermistor | • Defective Outdoor air temperature thermistor, broken wire or poor connector connection | Replacement, repair of temperature thermistor | 85 |
| | | | | | | | Outdoor control PCB | *• Defective outdoor control PCB (Defective temperature thermistor input circuit)? | Replacement of PCB | |
| E39 | | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | | Discharge pipe temperature thermistor | • Defective discharge pipe temperature thermistor, broken wire or poor connector connection | Replacement, repair of temperature thermistor | 86 |
| | | | | | | | Outdoor control PCB | *• Defective outdoor control PCB (Defective temperature thermistor input circuit)? | Replacement of PCB | |
| E40 | | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | | Installation or operating condition | • Rising high pressure (Operation of 63H1) • Service valve closing operation | Repair | 87 |
| | | | | | | | Outdoor control PCB | *• Defective outdoor control PCB (Defective 63H input circuit)? | Replacement of PCB | |
| E41 | | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | 2 times flash or 6 times flash | Inverter PCB or radiator fin | • Power transistor overheat (Single phase modelonly) | Replacement of PCB or Repair | 88 |
| E42 | | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | 1 time flash or 5 times flash | Outdoor control PCB compressor | • Current cut (Anomalous compressor over-current) | Replacement of PCB | 89 •90 |
| | | | | | | | Installation or operating condition | • Service valve closing operation | Repair | |
| E45 | | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | Keeps flashing | Outdoor control PCB | • Anomalous outdoor control PCB communication | Service valve opening check | 91 |
| | | | | | | | Inverter PCB | • Anomalous inverter PCB communication | Replacement of PCB | |
| E47 | | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | 7 times flash | Inverter PCB activefilter | • Defective outdoor inverter PCB (Model FDC 71) Defective active filter of control. | Replacement | 92 |
| E48 | | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | | Outdoor fan motor | • Anomalous outdoor fan motor | Replacement, repair | 93 |
| | | | | | | | Outdoor control PCB | *• Defective outdoor control PCB (Defective motor input circuit)? | Replacement of PCB | |
| E49 | | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | Keeps flashing | Installation or operating condition | • Low pressure error • Service valve closing operation | Repair | 94,95 |
| | | | | | | | Low pressure sensor | • Anomalous low pressure, broken wire of low pressure sensor or poor connector connection | Replacement, repair of sensor | |
| | | | | | | | Outdoor control PCB | *• Defective outdoor control PCB (Defective sensor input circuit)? | Replacement of control PCB | |
| E51 | | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | 2 times flash or 6 times flash | Inverter PCB | • Anomalous inverter PCB | Replacement of PCB | 96 |
| E53 | | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | | Suction pipe temperature thermistor | • Defective suction pipe temperature thermistor, broken wire or poor connector connection | Replacement, repair of temperature thermistor | 97 |
| | | | | | | | Outdoor control PCB | *• Defective outdoor PCB (Defective thermistor input circuit)? | Replacement of control PCB | |
| E54 | | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | Keeps flashing | Low pressure sensor | • Defective low pressure sensor | Replacement of sensor | 98 |
| | | | | | | | Outdoor control PCB | • Defective outdoor control PCB (Defective sensor input circuit)? | Replacement of control PCB | |
| E57 | | Stays OFF | Keeps flashing | 1 time flash | Keeps flashing | | Operation status | • Shortage in refrigerant quantity | Repair | 99 |
| | | | | | | | Installation status | • Service valve closing operation | Service valve opening check | |
| E59 | | Stays OFF | Keeps flashing | 5 times flash | Keeps flashing | Stays OFF or 4 times flash | Compressor inverter PCB | • Anomalous compressor startup | Replacement | 100 |

Note (1) * mark in the Description of trouble means that, in ordinary diagnosis, it cannot identify the cause definitely, and, if the trouble is repaired by replacing the part, it is judged consequently that the replaced part was defective.

## (iii) Optional controller in-use

| | | Indoor unit control PCB | | Outdoor unit control PCB | | Description of trouble | Repair method |
|---|---|---|---|---|---|---|---|
| Error code | Red LED | Red LED | Green LED | Red LED | Green LED | | |
| E75 | Keeps flashing | Stays OFF | Keeps flashing | Stays OFF | Keeps flashing | • Communication error (Defective communication circuit on the main unit of SC-SL2N-E or SC-SL3N-E) ete. | Replacement |

### (iv) Display sequence of error codes or inspection indicator lamps

■ **Occurrence of one kind of error**

Displays are shown respectively according to errors.

■ **Occurrence of plural kinds of error**

| Section | Category of display |
|---|---|
| **Error code on remote controller** | • Displays the error of higher priority (When plural errors are persisting) |
| **Red LED on indoor control PCB** | E1 > E5 > ····· > E10 > E32 > ····· E59 |
| **Red LED on outdoor control PCB** | • Displays the present errors. (When a new error has occurred after the former error was reset.) |

■ **Error detecting timing**

| Section | Error description | Error code | Error detecting timing |
|---|---|---|---|
| Indoor | Drain trouble (Float switch activated) | E9 | Whenever float switch is activated after 30 second had past since power ON. |
| | Communication error at initial operation | "WAIT" | No communication between indoor and outdoor units is established at initial operation. |
| | Remote controller communication circuit error | E1 | Communication between indoor unit and remote controller is interrupted for mote than 2 minutes continuously after initial communication was established. |
| | Communication error during operation | E5 | Communication between indoor and outdoor units is interrupted for mote than 2 minutes continuously after initial communication was established. |
| | Excessive number of connected indoor units by controlling with one remote controller | E10 | Whenever excessively connected indoor units is detected after power ON. |
| | Return air temperature thermistor anomaly | E7 | -50 (-45)°C or lower is detected for 5 (15) seconds continuously within 60 minutes after initial detection of this anomalous temperature. |
| | Indoor heat exchanger temperature thermistor anomaly | E6 | -50 (-28)°C or lower is detected for 5 (15) seconds continuously within 60 minutes after initial detection of this anomalous temperature.<br>Or 70°C or higher is detected for 5 seconds continuously. |
| Outdoor | Outdoor air temperature thermistor anomaly | E38 | -45°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature.<br>Or -45°C or higher is detected for 5 seconds continuously within 20 seconds after compressor ON. |
| | Outdoor heat exchanger temperature thermistor anomaly | E37 | -50°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature.<br>Or -50°C or lower is detected for 5 seconds continuously within 20 seconds after compressor ON. |
| | Discharge pipe temperature thermistor anomaly | E39 | -10°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature. |
| | Suction pipe temperature thermistor anomaly | E53 | -50°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature. |
| | Low pressure sensor anomaly | E54 | 0V or lower or 3.49V or higher is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous pressure. |
| | Underneath temperature thermistor anomaly | E55 | -50°C or lower is detected for 5 seconds continuously 3 times within 40 minutes after initial detection of this anomalous temperature. |

Note (1) Value in ( ) are for the models SRK50, 60.

■ **Error log and reset**

| Error indicator | Memorized error log | Reset |
|---|---|---|
| Remote controller display | • Higher priority error is memorized. | • Stop the unit by pressing the ON/OFF switch of remote controller.<br>• If the unit has recovered from anomaly, it can be operated. |
| Red LED on indoor control PCB | • Not memorized. | |
| Red LED on outdoor control PCB | • Memorizes a mode of higher priority. | |

■ **Resetting the error log**

• Resetting the memorized error log in the remote controller

Holding down “CHECK” button, press “TIMER” button to reset the error log memorized in the remote controller.

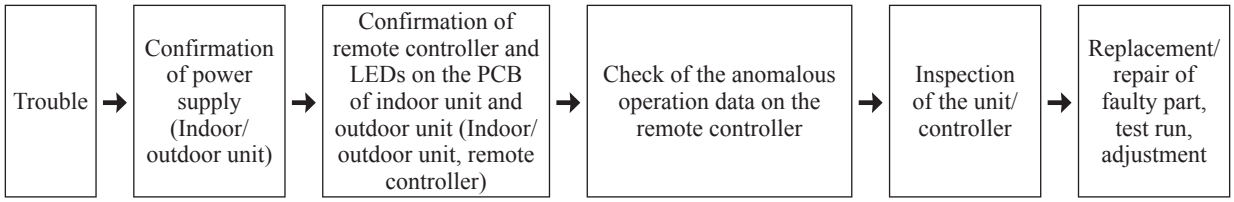
• Resetting the memorized error log

The remote controller transmits error log erase command to the indoor unit when “VENTI” button is pressed while holding down “CHECK” button.

Receiving the command, the indoor unit erase the log and answer the status of no error.

### (2) Troubleshooting procedure

When any trouble has occurred, inspect as follows. Details of respective inspection method will be described on later pages.


Trouble
Confirmation of power supply (Indoor/ outdoor unit)
Confirmation of remote controller and LEDs on the PCB of indoor unit and outdoor unit (Indoor/ outdoor unit, remote controller)
Check of the anomalous operation data on the remote controller
Inspection of the unit/ controller
Replacement/ repair of faulty part, test run, adjustment

### (3) Troubleshooting at the indoor unit

With the troubleshooting, find out any defective part by checking the voltage (AC, DC), resistance, etc. at respective connectors at around the indoor PCB, according to the inspection display or operation status of unit (the compressor does not run, fan does not run, the 4-way valve does not switch, etc.), and replace or repair in the unit of following part.

#### (a) Replacement part related to indoor PCB’s

Control PCB, power supply PCB, temperature thermistor (return air, indoor heat exchanger), remote controller switch, limit switch, transformer and fuse

Note (1) With regard to parts of high voltage circuits and refrigeration cycle, judge it according to ordinary inspection methods.

#### (b) Instruction of how to replace indoor control PCB

**SAFETY PRECAUTIONS**

- Read the "SAFETY PRECAUTIONS" carefully first of all and then strictly follow it during the replacement in order to protect yourself.
- The precautionary items mentioned below are distinguished into two levels, WARNING and CAUTION.
  Both mentions the important items to protect your health and safety so strictly follow them by any means.
  ⚠ WARNING — Wrong installation would cause serious consequences such as injuries or death.
  ⚠ CAUTION — Wrong installation might cause serious consequences depending on circumstances.
- After completing the replacement, do commissioning to confirm there are no anomaly.

**⚠ WARNING**

- Replacement should be performed by the specialist.
  If you replace the PCB by yourself, it may lead to serious trouble such as electric shock or fire.
- Replace the PCB correctly according to these instructions.
  Improper replacement may cause electric shock or fire.
- Shut off the power before electrical wiring work.
  Replacement during the applying the current would cause the electric shock, unit failure or improper running.
  It would cause the damage of connected equipment such as fan motor,etc.
- Fasten the wiring to the terminal securely, and hold the cable securely so as not to apply unexpected stress on the terminal.
  Loose connections or hold could result in abnormal heat generation or fire.
- Check the connection of wiring to PCB correctly before turning on the power, after replacement.
  Defectiveness of replacement may cause electric shock or fire.

**⚠ CAUTION**

- In connecting connector onto the PCB, connect not to deform the PCB. It may cause breakage or malfunction.
- Insert connecter securely, and hook stopper. It may cause fire or improper running.
- Bundle the cables together so as not to be pinched or be tensioned. It may cause malfunction or electric shock for disconnection or deformation.

## ◆ Model: FDT, FDTC series

PSB012D931F C

• Control PCB

Replace and set up the PCB according to this instruction.

### ① Set to an appropriate address and function using switch on PCB.

Select the same setting with the removed PCB.

| item | switch | Content of control | | | |
|---|---|---|---|---|---|
| Address | SW2 | Plural indoor units control by 1 remote controller | | | |
| Master /Slave setting | | Master | Slave1 | Slave2 | Slave3 |
| | SW5-1 | — | — | ○ | ○ |
| | SW5-2 | — | ○ | — | ○ |
| Test run | SW7-1 | — | Normal | | |
| | | ○ | Operation check/drain motor test run | | |

○:ON —:OFF

### ② Set to an appropriate capacity using the model selector switch(SW6).

Select the same capacity with the PCB removed from the unit.

| SW6 | -1 | -2 | -3 | -4 |
|---|---|---|---|---|
| 40V | ○ | ○ | — | — |
| 50V | ○ | — | ○ | — |
| 60V | ○ | ○ | ○ | — |
| 71V | ○ | — | — | ○ |

| SW6 | -1 | -2 | -3 | -4 |
|---|---|---|---|---|
| 100V | ○ | ○ | — | ○ |
| 125V | — | — | ○ | ○ |
| 140V | ○ | — | ○ | ○ |
| | | | | |

SW6

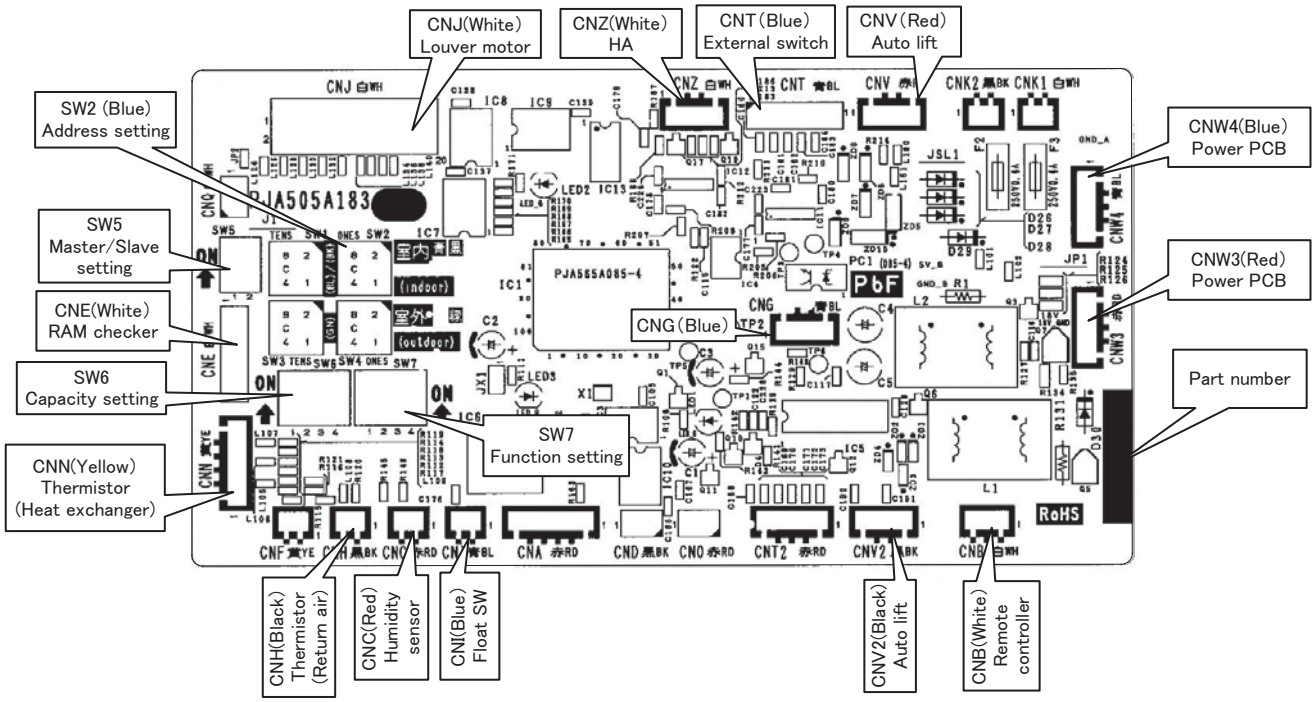
Example setting fro 50V

### ③ Replace the PCB

1. Fix the PCB so as not to pitch the cords.
2. Connect connectors to the PCB. Connect a cable connector with the PCB connector of the same color.
3. Do not pass CPU surrounding about wirings.

### ④ Control PCB

Parts mounting are different by the kind of PCB.



• Power PCB

PSB012D953A

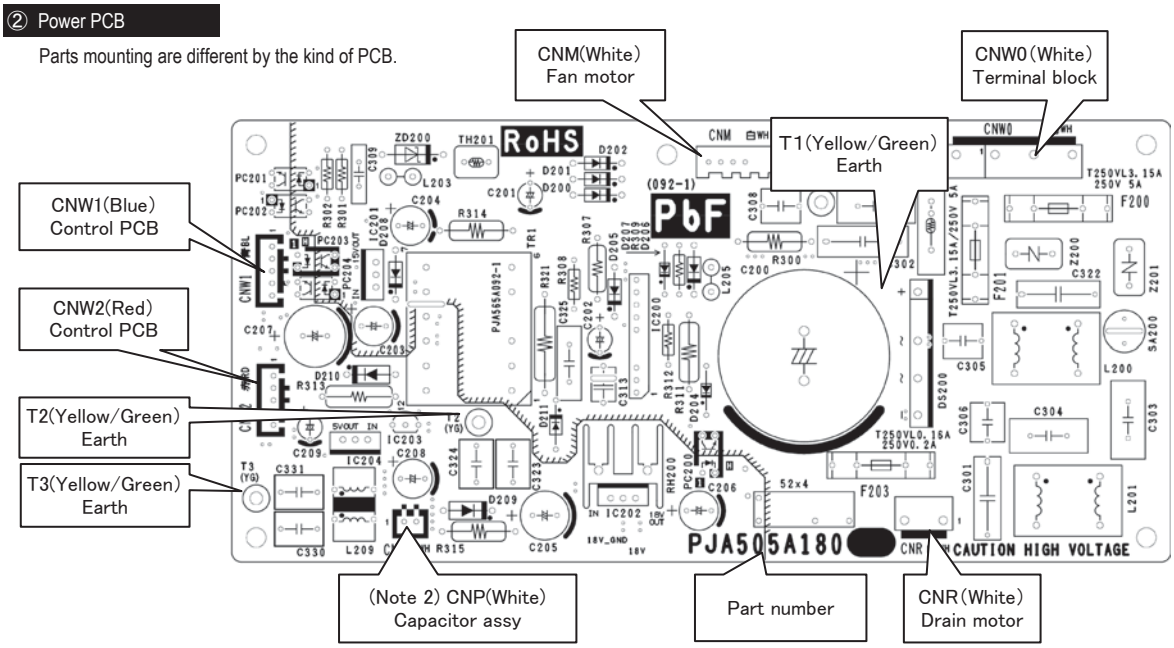
This PCB is a general PCB. Replace the PCB according to this instruction.

**① Replace the PCB** (refer to right dwg.)

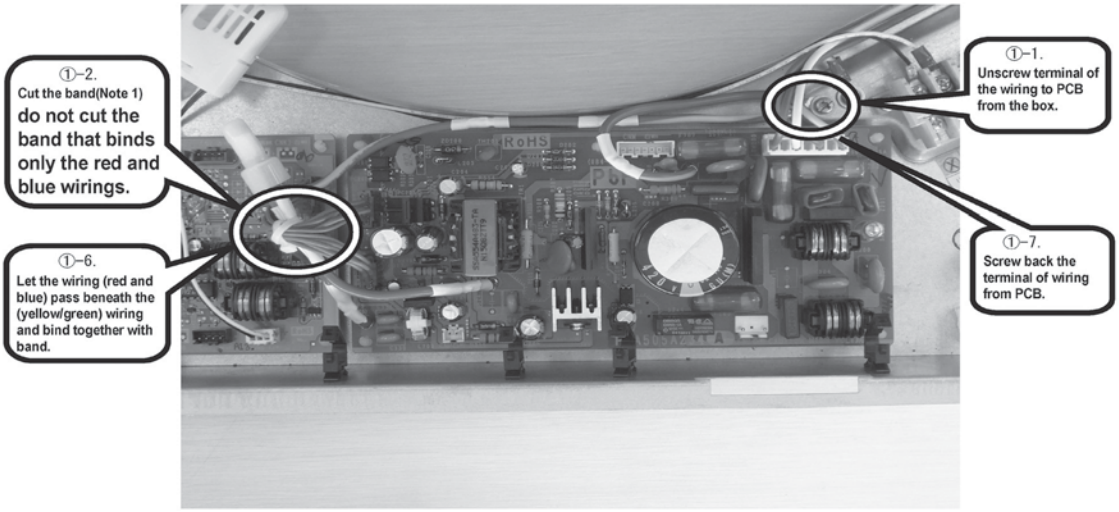
1. Unscrew terminal of the wiring(yellow/green) soldered to PCB from the box.
2. Cut the band that binds the wiring (red and blue) from connector CNW1 and CNW2, and the wiring (yellow/green) from PCB (T2/T3) . (Note 1)
   (However, do not cut the band that binds only the red and blue wirings.)
3. Replace the PCB only after all the wirings connected to the connector are removed.
4. Fix the board such that it will not pinch any of the wires.
5. Reconnect the wirings to the PCB. Wiring connector color should match with the color of connector of the PCB. (Note 2)
6. Let the wiring (red and blue) pass beneath the (yellow/green) wiring and bind together with band.
7. Screw back the terminal of wiring (yellow/green) from PCB(T1, T2/T3), that was removed in 1.
   In that case, do not place the crimping part of the wiring under the PCB.
   (Note 1): It might not be applicable on some models.
   (Note 2): After replacing PCB, connection between capacitor assy and connector CNP is **no longer needed.**

**② Power PCB**

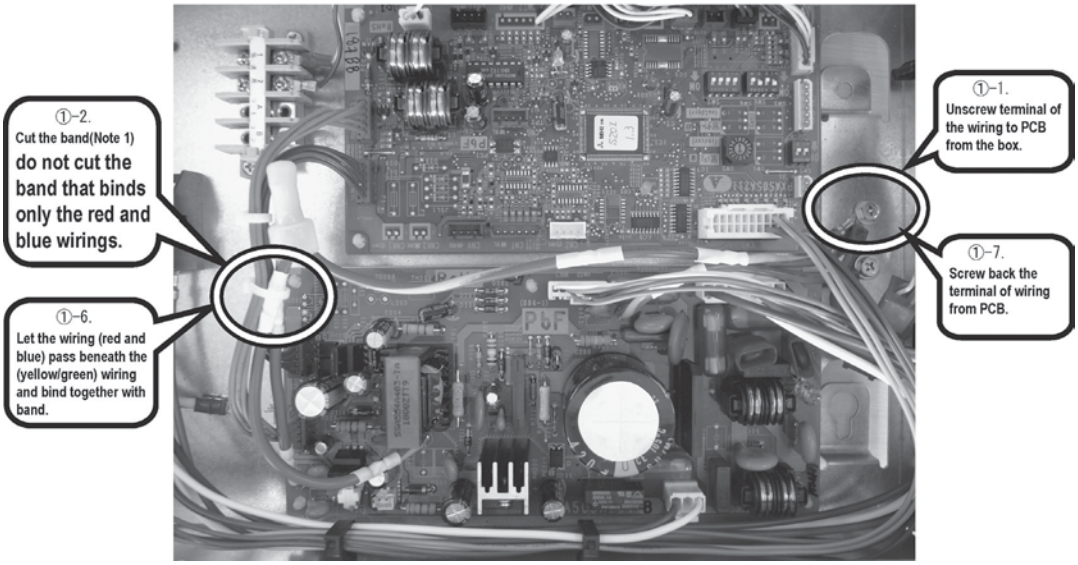
Parts mounting are different by the kind of PCB.




for F D T


①-2.
Cut the band(Note 1)
do not cut the band that binds only the red and blue wirings.
①-6.
Let the wiring (red and blue) pass beneath the (yellow/green) wiring and bind together with band.
①-1.
Unscrew terminal of the wiring to PCB from the box.
①-7.
Screw back the terminal of wiring from PCB.

for F D T C


①-2.
Cut the band(Note 1)
do not cut the band that binds only the red and blue wirings.
①-6.
Let the wiring (red and blue) pass beneath the (yellow/green) wiring and bind together with band.
①-1.
Unscrew terminal of the wiring to PCB from the box.
①-7.
Screw back the terminal of wiring from PCB.

## ◆ Model: FDUM, FDU, FDEN series

PSB012D933D Ⓓ

### ① Set to an appropriate address and function using switch on PCB.

1. There is a unit having plural applicable PCB depending on a model.
2. Set the function setting corresponding the spare PCB and the applicable model.

| item | switch | Content of control | | | |
|---|---|---|---|---|---|
| Address | SW2 | Plural indoor units control by 1 remote controller | | | |
| Master /Slave setting | | Master | Slave1 | Slave2 | Slave3 |
| | SW5-1 | — | — | ○ | ○ |
| | SW5-2 | — | ○ | — | ○ |
| Test run | SW7-1 | — | Normal | | |
| | | ○ | Operation check/drain motor test run | | |

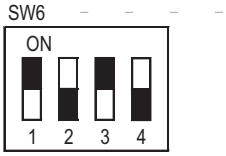
○ : ON — : OFF

### ② Set to an appropriate capacity using the model selector switch(SW6).

Select the same capacity with the PCB removed from the unit.

| SW6 | -1 | -2 | -3 | -4 |
|---|---|---|---|---|
| 40V | ○ | ○ | — | — |
| 50V | ○ | — | ○ | — |
| 60V | ○ | ○ | ○ | — |
| 71V | ○ | — | — | ○ |

| SW6 | -1 | -2 | -3 | -4 |
|---|---|---|---|---|
| 100V | ○ | ○ | — | ○ |
| 125V | — | — | ○ | ○ |
| 140V | ○ | — | ○ | ○ |
| | | | | |



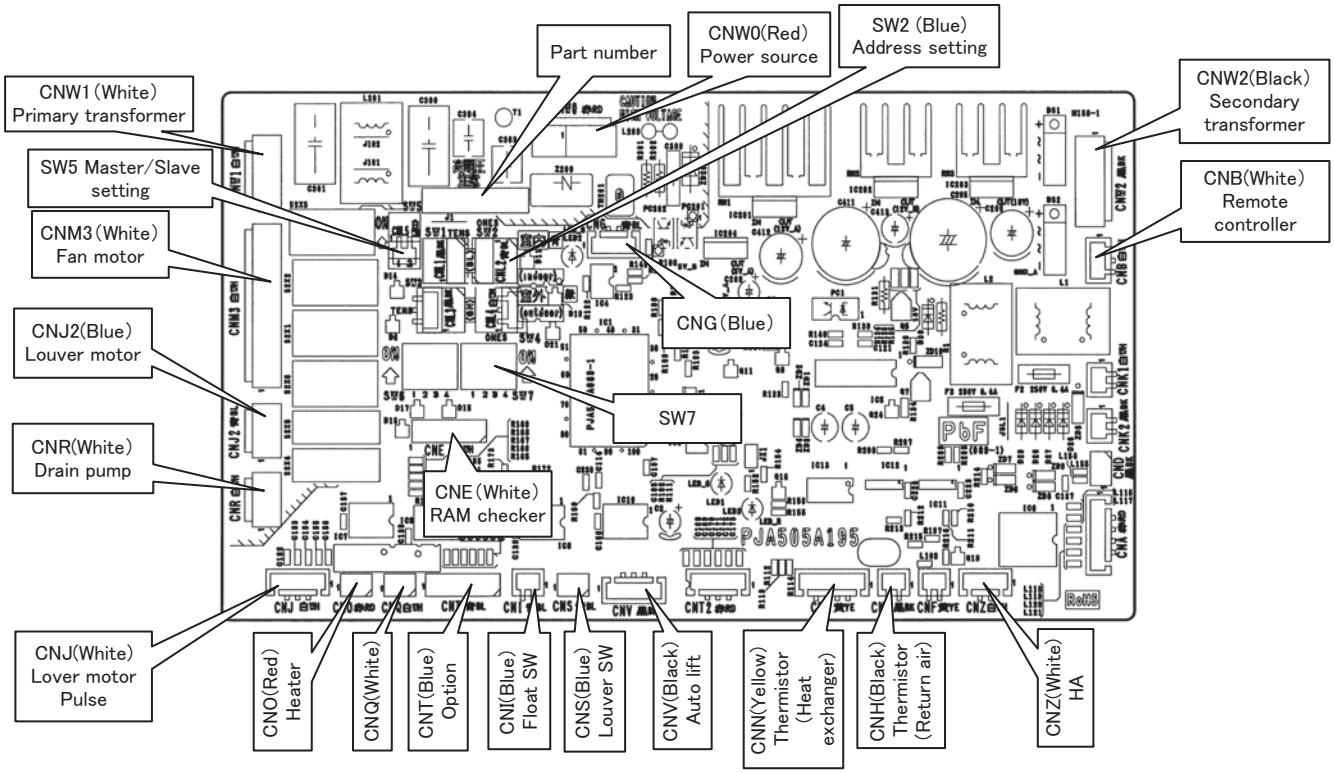

Example setting for 50V

### ③ Replace the PCB

1. Fix the PCB so as not to pitch the cords.
2. Connect connectors to the PCB. Connect a cable connector with the PCB connector of the same color.
3. Do not pass CPU surrounding about wirings.

### ④ Control PCB

Parts mounting are different by the kind of PCB.



## ●DIP switch setting list

| Switches | Description | | Default setting | | Remarks |
|---|---|---|---|---|---|
| SW2 | Address No. setting at plural indoor units control by 1 R/C | | 0 | | 0-F |
| SW5-1 | Master/Slave setting | Master*/Slave | OFF | | See table 2 |
| SW5-2 | | | OFF | | |
| SW6-1 | Model selection | | As per model | | See table 1 |
| SW6-2 | | | | | |
| SW6-3 | | | | | |
| SW6-4 | | | | | |
| SW7-1 | Test run, Drain motor | Normal*/Test run | OFF | Normal | |
| SW7-2 | Reserved | | OFF | | keep OFF |
| SW7-3 | Powerful mode | Valid*/Invalid(FDU only) | ON | Valid | |
| SW7-4 | Reserved | | OFF | | keep OFF |
| JSL1 | Superlink terminal spare | Normal*/switch to spare | With | | |

* Default setting

Table 1: Indoor unit model selection with SW6-1-SW6-4

0: OFF 1:ON

| | 40V | 50V | 60V | 71V | 100V | 125V | 140V |
|---|---|---|---|---|---|---|---|
| SW6-1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| SW6-2 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| SW6-3 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| SW6-4 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |

Table 2: Indoor unit Master/Slave setting with SW5-1,SW5-2

0: OFF 1:ON

| | SW5-1 | SW5-2 |
|---|---|---|
| Master | 0 | 0 |
| Slave1 | 0 | 1 |
| Slave2 | 1 | 0 |
| Slave3 | 1 | 1 |

### (4) Troubleshooting at the outdoor unit

When troubleshooting the outdoor unit, firstly assess the overview of malfunction and try to presume the cause and the faulty part by checking the error cord dispalyed on the remote controller and flashing pattern of indicator lamps (Red LED and Green LED), and then proceed further inspection and remedy it.

Self-diagnosis system by microcomputor on indoor and outdoor PCB can assist to find the cause of malfunction smoothly by making a diagnosis of not only the anomaly of microcomutor, but also the anomaly in power supply system, installation space, overload resulting from improper charging amount of refrigerant and etc.

Unless the power is reset, the error log is saved in memory and the inspection indicator lamps on outdoor PCB keep flashing after automatical recovering from malfunction.

After automatical recovering from malfunction, if any another error mode which has a higher priority than the previous error saved in memory occurs, it is overwritten in memory and is displayed.

**[Reset of power supply]**

Be sure to avoid electrical shock, when replacing or checking the outdoor control PCB, because some voltage is still retained in the electrolytic capacitor on the PCB even after shutting down tne power supply to the outdoor unit.

Be sure to start repairing work, after confirming that the Green LED on the PCB has been extiguished for more than 10 seconds after more than 3 minutes had been passed since power shut down, and reconfirming that voltage has been discharged sufficiently by measuring the voltage (DC) between both terminals of electrolytic capacitor (C58) (Measurment of voltage may be disturbed by the moisture-proof coating. In such case, remove the coating and measure it by taking care of avoiding electrical shock)

#### (a) Module of part to be replaced for outdoor unit controller

Outdoor control PCB, Inverter PCB, Temperature thermistor (of outdoor heat exchanger, discharge pipe, outdoor air, IPM and suction pipe), Fuses (for power supply and control PCB), Noise filter, Capacitor, Reactor and Transformer

#### (b) Replacement procedure of outdoor control PCB

**Precautions for Safety**

- Since the following precaution is the important contents for safety, be sure to observe them.
  WARNING and CAUTION are described as follows:

| | |
|---|---|
| ⚠WARNING | Indicates an imminently hazardous situation which will result in death or serious injury if proper safety procedures and instructions are not adhered to. |
| ⚠CAUTION | Indicates a potentially hazardous situation which may result in minor or moderate injury if proper safety procedures and instructions are not adhered to. |

**⚠ WARNING**

- Securely replace the PCB according to this procedure.
  If the PCB is incorrectly replaced, it will cause an electric shock or fire.
- Be sure to check that the power source for the outdoor unit is turned OFF before replacing the PCB. The PCB replacement under current-carrying will cause an electric shock or fire.
- After finishing the PCB replacement, check that wiring is correctly connected with the PCB before power distribution. If the PCB is incorrectly replaced, it will cause an electric shock or fire.

**⚠ CAUTION**

- Band the wiring so as not to tense because it will cause an electric shock.

**1) Model FDC71VNX**

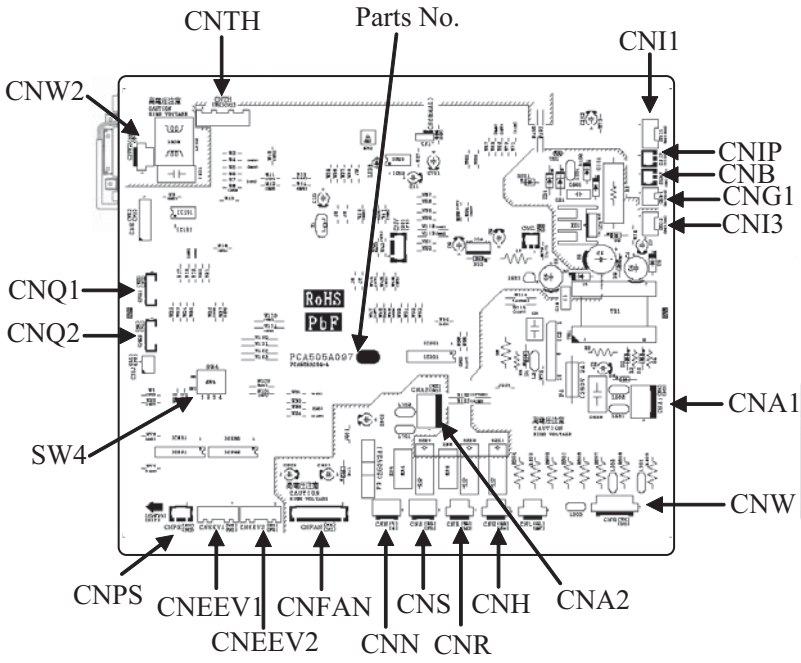
PCA012D021C

a) Replace the PCB **after elapsing 3 minutes from power OFF.**
**(Be sure to measure voltage (DC)** between T26 and T27 on inverter PCB, and **check that the voltage is discharged sufficiently(10V or less)**.(Refer to Fig.1))

b) Disconnect the connectors from the control PCB.

c) Match the switches setting (SW4) with the former PCB.

d) Connect the connectors to the control PCB.(Confirm the **connectors are not half inserted**.)




Parts Arrangement View

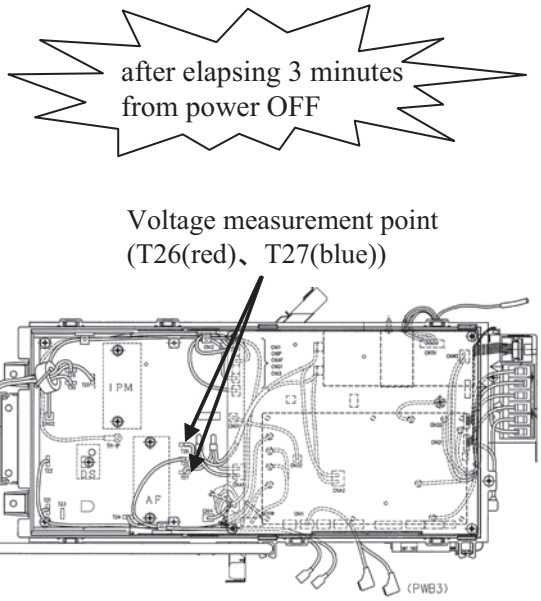
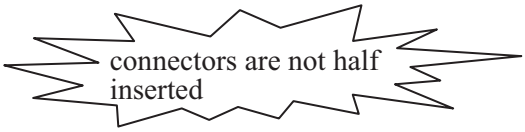



Fig.1 Position of terminal



**2) Model FDC100VNX, 125VNX, 140VNX**
**FDC100VSX, 125VSX, 140VSX**

PCA012D024F

a) Replace the PCB **after elapsing 3 minutes from power OFF**.

b) Measurement was done on both ends of connector(CNA1) during measurement, **the voltage(DC) might charged the electrolytic capacitor, be sure that the voltage is discharged sufficiently.** (Refer to Fig.1)

c) Disconnect the connectors from the control PCB.

d) Disconnect the white or blue wiring passing through CT1 on the PCB before replacing the PCB.

e) Match the setting switches (SW3-5, JSW, SW(J5-7)) with the former PCB.

f) Tighten up a screw after passing white or blue wiring through CT1 of the changed.

g) Please connect the connectors with the same place. (Confirm the **connectors are not half inserted**.)

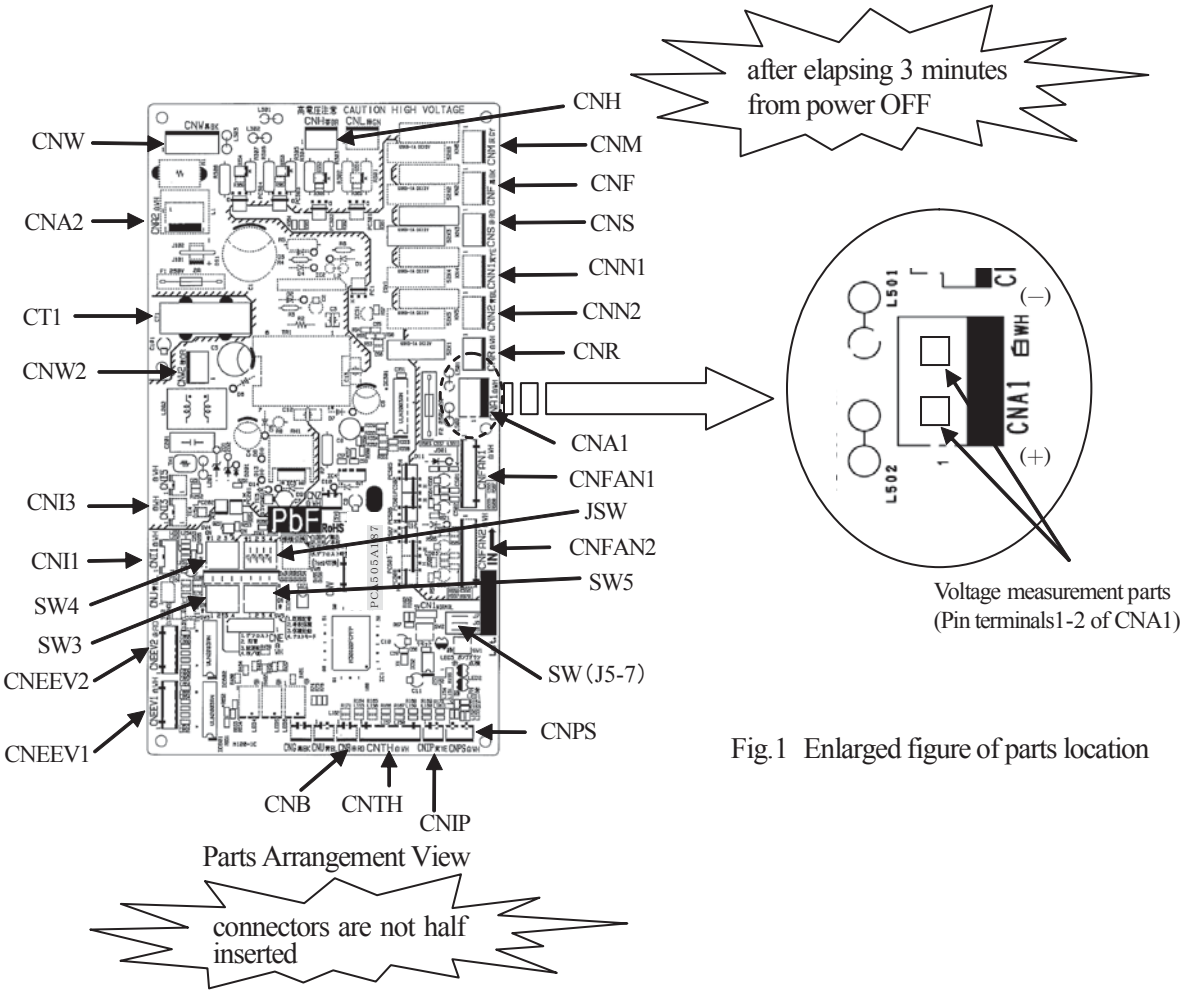



Fig.1 Enlarged figure of parts location

### (c) Outdoor inverter PCB replacement procedure

**Precautions for Safety**

- Since the following precaution is the important contents for safety, be sure to observe them.
  WARNING and CAUTION are described as follows:

**⚠ WARNING** Indicates an imminently hazardous situation which will result in death or serious injury if proper safety procedures and instructions are not adhered to.

**⚠ CAUTION** Indicates a potentially hazardous situation which may result in minor or moderate injury if proper safety procedures and instructions are not adhered to.

**⚠ WARNING**

- Securely replace the PCB according to this procedure.
  If the PCB is incorrectly replaced, it will cause an electric shock or fire.
- Be sure to check that the power source for the outdoor unit is turned OFF before replacing the PCB. The PCB replacement under current-carrying will cause an electric shock or fire.
- After finishing the PCB replacement, check that wiring is correctly connected with the PCB before power distribution. If the PCB is incorrectly replaced, it will cause an electric shock or fire.

**⚠ CAUTION**

- Band the wiring so as not to tense because it will cause an electric shock.

Replace the inverter PCB according to the following procedure.

#### 1) Model FDC71VNX

PCA012D022G B

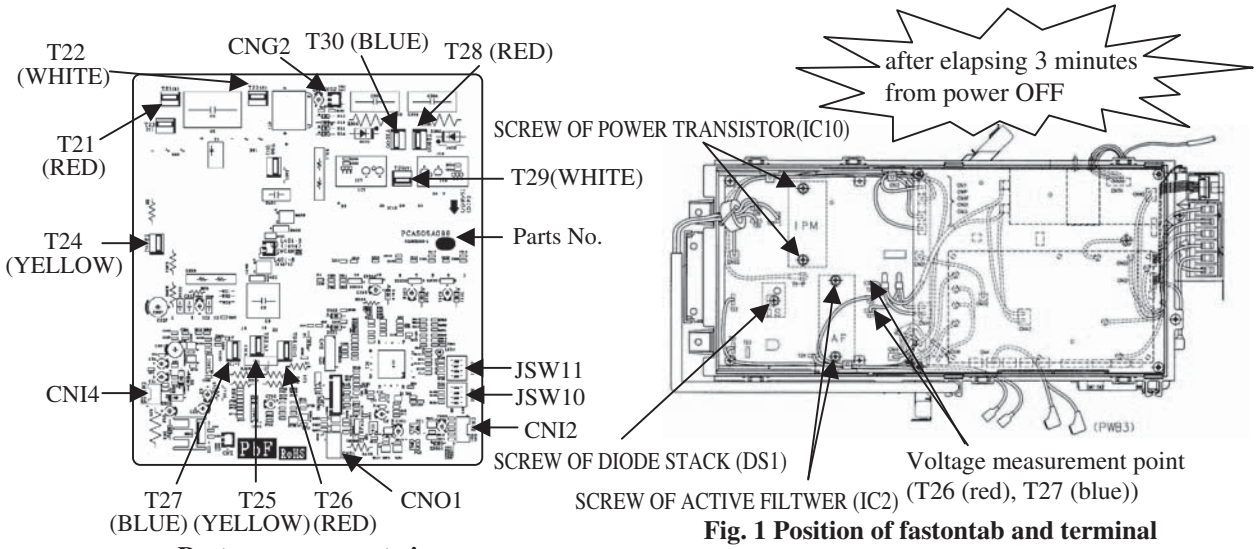
a) Replace the PCB **after elapsing 3 minutes from power OFF.** (**Be sure to measure voltage (DC)** between T26 and T27 on inverter PCB, and **check that the voltage is discharged sufficiently (10V or less)**. (Refer to Fig.1))

b) Take off the connection of inverter PCB terminal and connector, and remove the screw of power transistor (IC10), active filter (IC2), and diode stack (DS1) then remove the PCB. Wipe off the silicon grease neatly on the controller's radiation heat fins. (Refer to Fig.1 and Parts arrangement view)

c) Refer to table1 for the setting of switch (JSW10, 11) of new PCB.

d) Before installing the power transistor (IC10), active filter (IC2), and diode stack (DS1) on the new PCB, apply silicon grease equally to the their surface. (Make full use of the silicon grease.) **They may be damaged unless they apply it**.

e) Tighten the screw of power transistor (IC10), active filter (IC2), and diode stack (DS1) on inverter PCB and connect terminal and connector. Confirm the connection and there is not the half insertion. **Tighten properly power transistor, (IC10) active filter (IC2), and diode stack (DS1) with a screw and make sure there is no slack. They can be damage if not properly tighten.** (Recommended tightening torque: power transistor (IC10)1.2±0.1 and active filter (IC2)0.98±0.1, diode stack(DS1) 0.5±0.1 Unit N·m




**Parts arrangement view**

**Fig. 1 Position of fastontab and terminal**

Connectors are not half inserted

**Table. 1 Switch setting**

| | | | | | |
|---|---|---|---|---|---|
| JSW10 | -1 | OFF | JSW11 | -1 | ON |
| | -2 | OFF | | -2 | ON |
| | -3 | OFF | | -3 | O N |
| | -4 | OFF | | -4 | O N |

**2) Model FDC100VNX, 125VNX, 140VNX**

PCA012D025D F

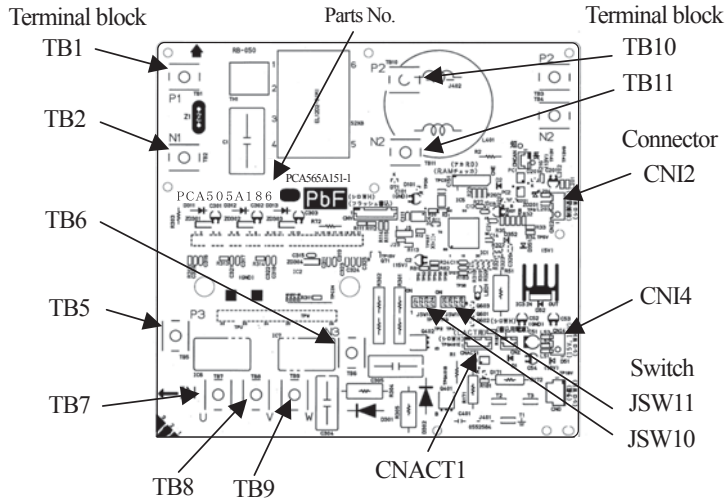
a) Replace the PCB **after elapsing 3 minutes from power OFF**.
(**Be sure to measure voltage (DC)** on both capacitor terminals located in controller back, and **check that the voltage is discharged sufficiently**.(Refer to Fig.1))

b) Take off the connection of inverter PCB terminal block connector and remove the screw of power transistor then remove the PCB. Wipe off the silicon grease neatly on the controller's radiation heat fins.

c) Match the setting switches (JSW10,11) of new PCB with the former PCB.

d) Before installing the power transistor on the new PCB,Apply uniformly a bundled of silicon grease first on the surface of power transistor.Make sure it is applied to prevent damage on power transistor.

e) Tighten the screw of power transistor on inverter PCB and connect the terminal block.Confirm the connection and don't use soldering in the connection.Tighten properly the power transistor with a screw and make sure there is no slack.Power transistor can be damage if not properly tighten.(Recommended power transistor tightening torque:0.98~1.47N·m)




Parts arrangement view

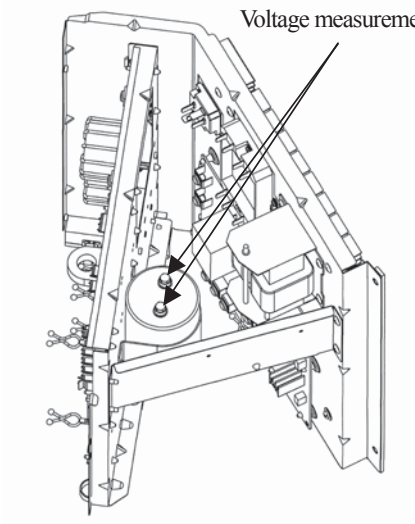



Fig.1 Position of capacitor

Table. 1 Switch setting

| | | | | | |
|---|---|---|---|---|---|
| JSW10 | -1 | OFF | JSW11 | -1 | OFF |
| | -2 | OFF | | -2 | OFF |
| | -3 | OFF | | -3 | ON |
| | -4 | OFF | | -4 | ON |

**3) Model FDC100VSX, 125VSX, 140VSX**

PCA012D025F F

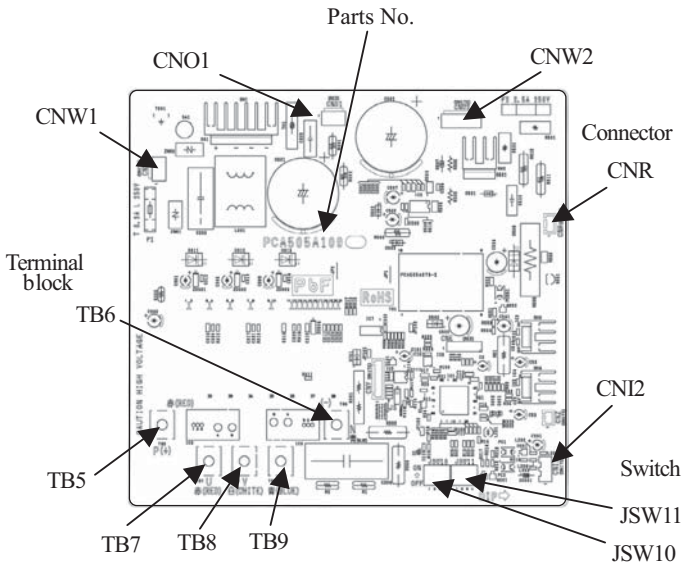
a) Replace the PCB **after elapsing 3 minutes from power OFF**.
(**Be sure to measure voltage (DC)** on both capacitor terminals located in controller back, and **check that the voltage is discharged sufficiently**.(Refer to Fig.1))

b) Take off the connection of inverter PCB terminal block connector and remove the screw of power transistor then remove the PCB. Wipe off the silicon grease neatly on the controller's radiation heat fins.

c) Match the setting switches (JSW10,11) of new PCB with the former PCB.

d) Before installing the power transistor on the new PCB, Apply uniformly a bundled of silicon grease first on the surface of power transistor.Make sure it is applied to prevent damage on power transistor.

e) Tighten the screw of power transistor on inverter PCB and connect the terminal block.Confirm the connection and don't use soldering in the connection.Tighten properly the power transistor with a screw and make sure there is no slack.Power transistor can be damage if not properly tighten.(Recommended power transistor tightening torque:0.98~1.47N·m)




Parts arrangement view

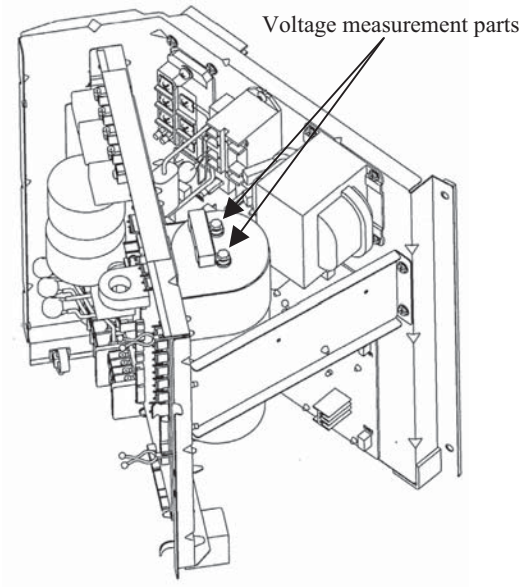



Fig.1 Position of capacitor

Table. 1 Switch setting

| | | | | | |
|---|---|---|---|---|---|
| JSW10 | -1 | OFF | JSW11 | -1 | ON |
| | -2 | OFF | | -2 | OFF |
| | -3 | OFF | | -3 | ON |
| | -4 | OFF | | -4 | ON |

# ●DIP switch setting list (Outdoor unit)

**(1) Control PCB**

Model FDC71VNX

| Switches | Description | | Default setting | | Remarks |
|---|---|---|---|---|---|
| SW3-1 | Defrost condition | Normal*/Cold region | OFF | Normal | |
| SW3-2 | Snow protection control | Normal*/Snow protection | OFF | Normal | |
| SW3-3 | Model selection | Cooling only/Heat pump* | OFF | Heat pump | Keep OFF |
| SW3-4 | Defrost prohibition time | ON:37min/OFF:45min | ON | 37min. | |
| SW4-1 | Model selection | Domestic/Overseas* | ON | Overseas | Keep ON |
| SW4-2 | Model selection | 3-phase/Single phase* | ON | Single phase | Keep ON |
| SW4-3 | Reserved | | OFF | | Keep OFF |
| SW4-4 | Space | | OFF | | Keep OFF |
| SW5-1 | Model selection | Capacity | OFF | | Keep OFF |
| SW5-2 | Model selection | Capacity | OFF | | Keep OFF |
| SW5-3 | Test run SW | Normal*/Test run | OFF | Normal | |
| SW5-4 | Test run mode | Cooling*/Heating | OFF | Cooling | |
| SW7-1 | Space | | OFF | | |
| SW7-2 | Anti-frost control | Valid*/Invalid | OFF | Valid | |
| SW7-3 | Space | | OFF | | Keep OFF |
| SW8-1 | Reserved | | OFF | | Keep OFF |
| SW8-2 | Space | | OFF | | Keep OFF |
| SW8-3 | Space | | OFF | | Keep OFF |
| SW9 | Pump down operation | Normal*/Pump down | OFF | Normal | |

*Default setting

Models FDC100,125,140VNX,100,125,140VSX

| Switches | Description | | Default setting | | Remarks |
|---|---|---|---|---|---|
| SW1 | Pump down operation | Normal*/Pump down | OFF | Normal | |
| JSW1-1 | Model selection | | As per model | | See table 1 |
| JSW1-2 | | | | | |
| JSW1-3 | | | | | |
| JSW1-4 | | | | | |
| SW3-1 | Defrost condition | Normal*/Cold region | OFF | Normal | |
| SW3-2 | Snow protection control | Normal*/Snow protection | OFF | Normal | |
| SW3-3 | Test run SW | Normal*/Test run | OFF | Normal | |
| SW3-4 | Test run mode | Cooling*/Heating | OFF | Cooling | |
| SW4-1 | Model selection | Domestic/Overseas* | ON | Overseas | See table 1 |
| SW4-2 | Model selection | 3-phase/Single phase | As per model | | See table 1 |
| SW4-3 | Reserved | | OFF | | Keep OFF |
| SW4-4 | Reserved | | OFF | | Keep OFF |
| SW5-1 | Reserved | | OFF | | Keep OFF |
| SW5-2 | Reserved | | OFF | | Keep OFF |
| SW5-3 | Reserved | | OFF | | Keep OFF |
| SW5-4 | Reserved | | OFF | | Keep OFF |
| J5 | Anti-frost control | Valid*/Invalid | With | Valid | |
| J7 | Outdoor fan control when ducting | Normal*/Hi tap | With | Normal | |

* Default setting

Table 1: Outdoor unit model selection with JSW1-1-JSW1-4 and SW4-1-SW4-2

0: OFF 1:ON

| | 100VNX | 100VSX | 125VNX | 125VSX | 140VNX | 140VSX |
|---|---|---|---|---|---|---|
| JSW1-1 | 0 | 0 | 1 | 1 | 0 | 0 |
| JSW1-2 | 0 | 0 | 0 | 0 | 1 | 1 |
| JSW1-3 | 0 | 0 | 0 | 0 | 0 | 0 |
| JSW1-4 | 0 | 0 | 0 | 0 | 0 | 0 |
| SW4-1 | 1 | 1 | 1 | 1 | 1 | 1 |
| SW4-2* | 1 | 0 | 1 | 0 | 1 | 0 |

* 3-phase: OFF/Single phase: ON

**(2) Inverter PCB**

| Switches | 71VNX | 100, 125, 140VNX | 100, 125, 140VSX |
|---|---|---|---|
| | Single phase models | Single phase models | 3-phase models |
| JSW10-1 | OFF | OFF | OFF |
| JSW10-2 | OFF | OFF | OFF |
| JSW10-3 | OFF | OFF | OFF |
| JSW10-4 | OFF | OFF | OFF |
| JSW11-1 | ON | OFF | ON |
| JSW11-2 | ON | OFF | OFF |
| JSW11-3 | ON | ON | ON |
| JSW11-4 | ON | ON | ON |

### (5) Check of anomalous operation data with the remote controller

Operation data can be checked with remote control unit operation.

① Press the CHECK button.
The display change " OPER DATA ▼ "

② Press the ○ (SET) button while " OPER DATA ▼ " is displayed.

③ When only one indoor unit is connected to remote controller, " DATA LOADING " is displayed (blinking indication during data loading).
Next, operation data of the indoor unit will be displayed. Skip to step ⑦.

④ When plural indoor units is connected, the smallest address number of indoor unit among all connected indoor unit is displayed.
[Example]:
" SELECT I/U " (blinking 1 seconds) → " I/U000 ▲ " blinking.

⑤ Select the indoor unit number you would like to have data displayed with the ▲ ▼ button.

⑥ Determine the indoor unit number with the ○ (SET) button.
(The indoor unit number changes from blinking indication to continuous indication)
" I/U000 " (The address of selected indoor unit is blinking for 2 seconds.)
↓
" DATA LOADING " (A blinking indication appears while data loaded.)
Next, the operation data of the indoor unit is indicated.

⑦ Upon operation of the ▲ ▼ button, the current operation data is displayed in order from data number 01.
The items displayed are in the above table.
*Depending on models, the items that do not have corresponding data are not displayed.

| Number | Data Item | |
|---|---|---|
| 01 | ✻ | (Operation Mode) |
| 02 | SET TEMP___℃ | (Set Temperature) |
| 03 | RETURN AIR___℃ | (Return Air Temperature) |
| 04 | SENSOR___℃ | (Remote Controller Thermistor Tempeature) |
| 05 | THI-R1___℃ | (Indoor Heat Exchanger Thermistor / U Bend) |
| 06 | THI-R2___℃ | (Indoor Heat Exchanger Thermistor /Capillary) |
| 07 | THI-R3___℃ | (Indoor Heat Exchanger Thermistor /Gas Header) |
| 08 | I/U FANSPEED___ | (Indoor Unit Fan Speed) |
| 09 | DEMAND___Hz | (Frequency Requirements) |
| 10 | ANSWER___Hz | (Response Frequency) |
| 11 | I/U EEV____P | (Pulse of Indoor Unit Expansion Value) |
| 12 | TOTAL I/U RUN___H | (Total Running Hours of The Indoor Unit) |
| 21 | OUTDOOR___℃ | (Outdoor Air Temperature) |
| 22 | THO-R1___℃ | (Outdoor Heat Exchanger Thermistor) |
| 23 | THO-R2___℃ | (Outdoor Heat Exchanger Thermistor) |
| 24 | COMP___Hz | (Compressor Frequency) |
| 25 | HP____MPa | (High Pressure) |
| 26 | LP____MPa | (Low Pressure) |
| 27 | Td___℃ | (Discharge Pipe Temperature) |
| 28 | COMP BOTTOM___℃ | (Comp Bottom Temperature) |
| 29 | CT___AMP | (Current) |
| 30 | TARGET SH___℃ | (Target Super Heat) |
| 31 | SH___℃ | (Super Heat) |
| 32 | TDSH___℃ | (Discharge Pipe Super Heat) |
| 33 | PROTECTION No.__ | (Protection State No. of The Compressor) |
| 34 | O/U FANSPEED___ | (Outdoor Unit Fan Speed) |
| 35 | 63H1 | (63H1 On/Off) |
| 36 | DEFROST | (Defrost Control On/Off) |
| 37 | TOTAL COMP RUN___H | (Total Running Hours of The Compressor) |
| 38 | O/U EEV1____P | (Pulse of The Outdoor Unit Expansion Valve EEVC) |
| 39 | O/U EEV2____P | (Pulse of The Outdoor Unit Expansion Valve EEVH) |

⑧ To display the data of a different indoor unit, press the AIR CON NO. button, which allows you to go back to the indoor unit selection screen.

⑨ Pressing the ①ON/OFF button will stop displaying data.
Pressing the ⁄⁄ (RESET) button during remote control unit operation will undo your last operation and allow you to go back to the previous screen.

⊙If two (2) remote controllers are connected to one (1) inside unit, only the master controller is available for trial operation and confirmation of operation data. (The slave remote controller is not available.)

**●Details of Compressor protection status No. 33**

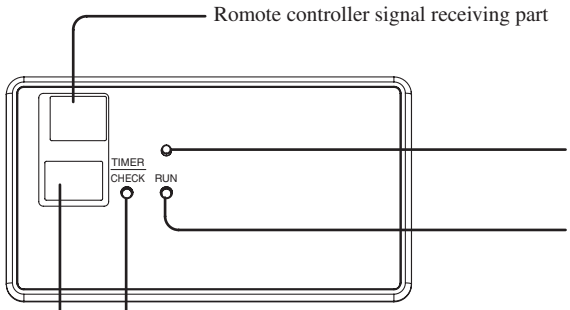
| No. | Contents of display | In case of FDC100-140 refer to |
|---|---|---|
| "0" | Normal | |
| "1" | Discharge pipe temperature protection control | P.25, (6).(a).1) |
| "2" | Discharge pipe temperature anomaly | P.25, (6).(a).2) |
| "3" | Current safe control of inverter primary current | P.27, (6).(g) |
| "4" | High pressure protection control | P.25, (6).(b).1), P.26, (6).(c).1) |
| "5" | High pressure anomaly | P.25, (6).(b).2) |
| "6" | Low pressure protection control | P.26, (6).(e).1) |
| "7" | Low pressure anomaly | P.26, (6).(e).2) |
| "8" | Anti-frost prevention control | P.27, (6).(k) |
| "9" | Current cut | P.27, (6).(g) |
| "10" | Power transistor protection control | P.27, (6).(h) |
| "11" | Power transistor anomaly (Overheat) | P.27, (6).(i) |
| "12" | Compression ratio control | P.26, (6).(f) |
| "13" | Spare | |
| "14" | Dewing prevention control | P.28, (6).(l) |
| "15" | Current safe control of inverter secondary current | P.27, (6).(g) |
| "16" | Stop by compressor rotor lock | |
| "17" | Stop by compressor startup failure | P.28, (6).(q) |

Note(1) Operation data display on the remote controller.
・Data is dispalyed until canceling the protection control.
・In case of multiple protections controlled, only the younger No. is displayed.
Note(2) Common item.
① In heating mode.
During protection control by the command signal for reducing compressor frequency from indoor unit, No. "4" is displayed.
② In cooling and dehumidifying mode.
During protection control by the command signal for reducing compressor frequency from indoor unit, No. "8" is displayed.

### (6) Inspection display of wireless specification model (FDEN, FDT)

(a) Display

1) FDEN Series




Romote controller signal receiving part

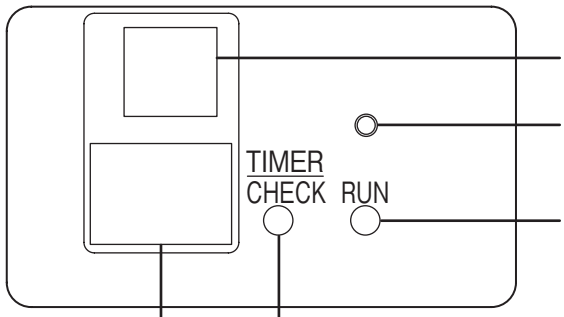
Backup switch

Operation display light (Green)
- Lights continuously: Under air conditioner operation
- Keeps flashing: Under heating preparation (At the time of heating operation)
- 3 time flash: Under reception of a remote controller signal

Timer/Check display light (Yellow)
- Lights continuously: Under timer operation
- 0.5 seconds lighting, 0.5 seconds stays OFF : At the time of anomalous
- 2 seconds lighting, 1 second stays OFF : Filter sign

Check monitor
(Error code display E1~E60)

2) FDT (Wireless kit)




Romote controller signal receiving part

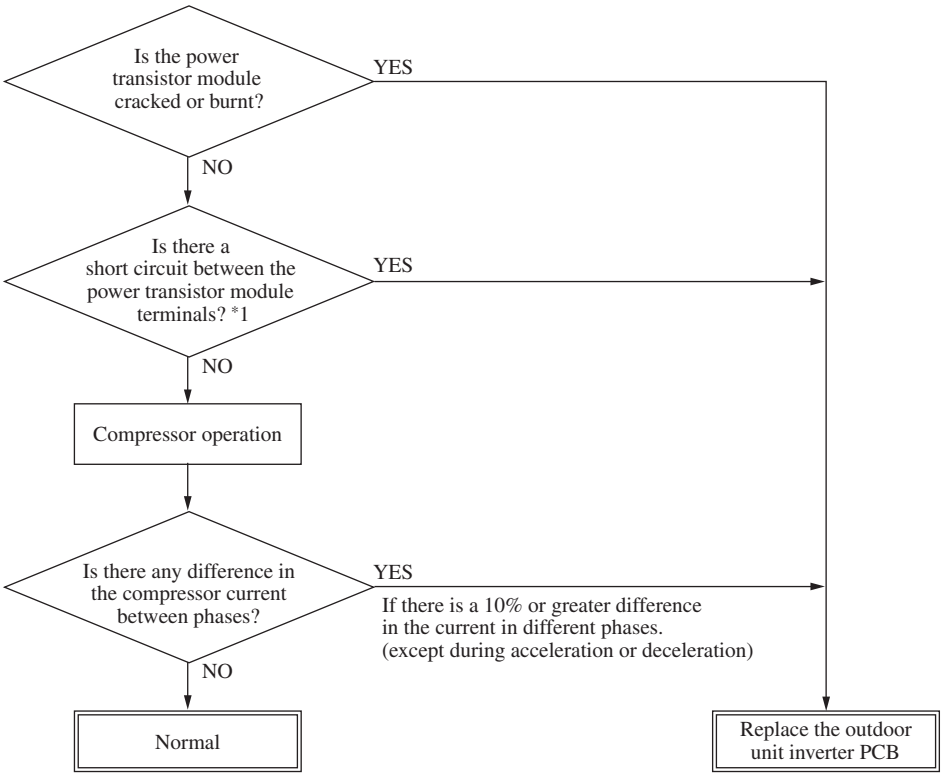
Backup switch

Operation display light (Green)
- Lights continuously: Under air conditioner operation
- Keeps flashing: Under heating preparation (At the time of heating operation)
- 3 time flash: Under reception of a remote controller signal

Timer/Check display light (Yellow)
- Lights continuously: Under timer operation
- 0.5 seconds lighting, 0.5 seconds stays OFF : At the time of anomalous
- 2 seconds lighting, 1 second stays OFF : Filter sign

Check monitor
(Error code display E1~E60)

### (7) Power transistor module (including the driver PCB) inspection procedure


Is the power transistor module cracked or burnt?
YES
NO
Is there a short circuit between the power transistor module terminals? *1
YES
NO
Compressor operation
Is there any difference in the compressor current between phases?
YES
If there is a 10% or greater difference in the current in different phases. (except during acceleration or deceleration)
NO
Normal
Replace the outdoor unit inverter PCB

### *1 Power transistor module terminal short circuit check procedure

Disconnect the compressor wiring, then conduct a short circuit check.

P-U, P-V, P-W

N-U, N-V, N-W

Check between the P-N terminals.

Bring the tester probes in contact with the following places on each te rminal.

P: Power transistor P terminal,

N: Power transistor N terminal,

U: End of red harness to compressor

V: End of white harness to compressor

W: End of black or blue harness to compressor

Check for a power transistor short circuit.

- When you do not have a diagnostic checker for judging if the inverter is defective, measure between the terminals of the power transistor parts, judge whether the power transistor is defective or not.
- Disconnect the compressor, then measure with the controller incorporated.

| Tester | | Normal values (Ω) | |
|---|---|---|---|
| Terminal (+) | Terminal (-) | Model 71 | Model 100~140 |
| P | N | 0 ~ (Numerical value rises.) | Approx. 1 M |
| N | P | | Approx. 300~400 |
| P | U | Several M (Numerical value rises.) | 0 |
| P | V | | |
| P | W | | |
| N | U | Approx. 650 k | Approx. 1.2 M |
| N | V | | |
| N | W | | |
| U | P | Approx. 670 k | Approx. 1.3 M |
| V | P | Approx. 4.4 M | |
| W | P | Approx. 4.4 M | |
| U | N | Approx. 650 k | 0 |
| V | N | Approx. 4.8 M | |
| W | N | Approx. 4.9 M | |

If the measured values range from 0 ~ several kW, there is a possibility that the elements are damaged, so replace the power transistor parts.

### (8) Inverter checker for diagnosis of inverter output

●Checking method

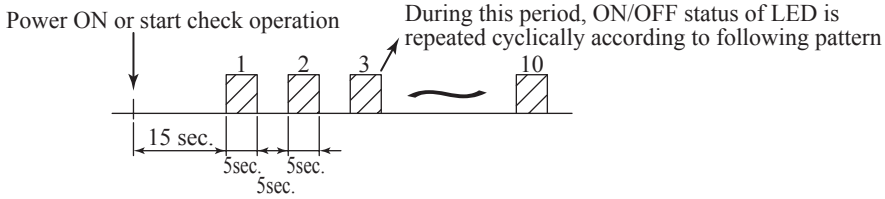
(a) Setup procedure of checker.

1) Power OFF (Turn off the breaker).
2) Remove the terminal cover of compressor and disconnect the wires (U, V, W) from compressor.
3) Connect the wires U (Red) , V (White) and W (Black) of checker to the terminal of disconnected wires (U, V, W) from compressor respectively.

(b) Operation for judgment.

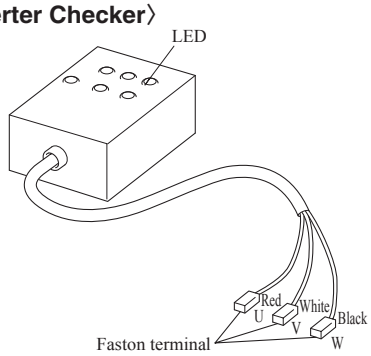
1) Power ON after JSW10-4 on outdoor inverter PCB was turned ON.
2) After 15 seconds since power has turned ON
   LED start ON/OFF for 5 seconds cyclically and it repeats 10 times.
3) Check ON/OFF status of 6 LED's on the checker.
4) Judge the PCB by ON/OFF status of 6 LED's on the checker.

| ON/OFF status of LED | If all of LED are ON/OFF according to following pattern | If all of LED stay OFF or some of LED are ON/OFF |
|---|---|---|
| Inverter PCB | Normal | Anomalous |



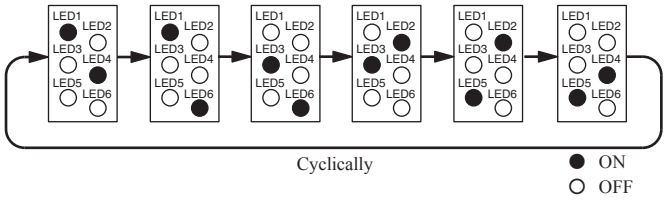

e) Be sure to turn off JSW10-4 on outdoor inverter PCB, after finishing the check operation.

〈**Inverter Checker**〉

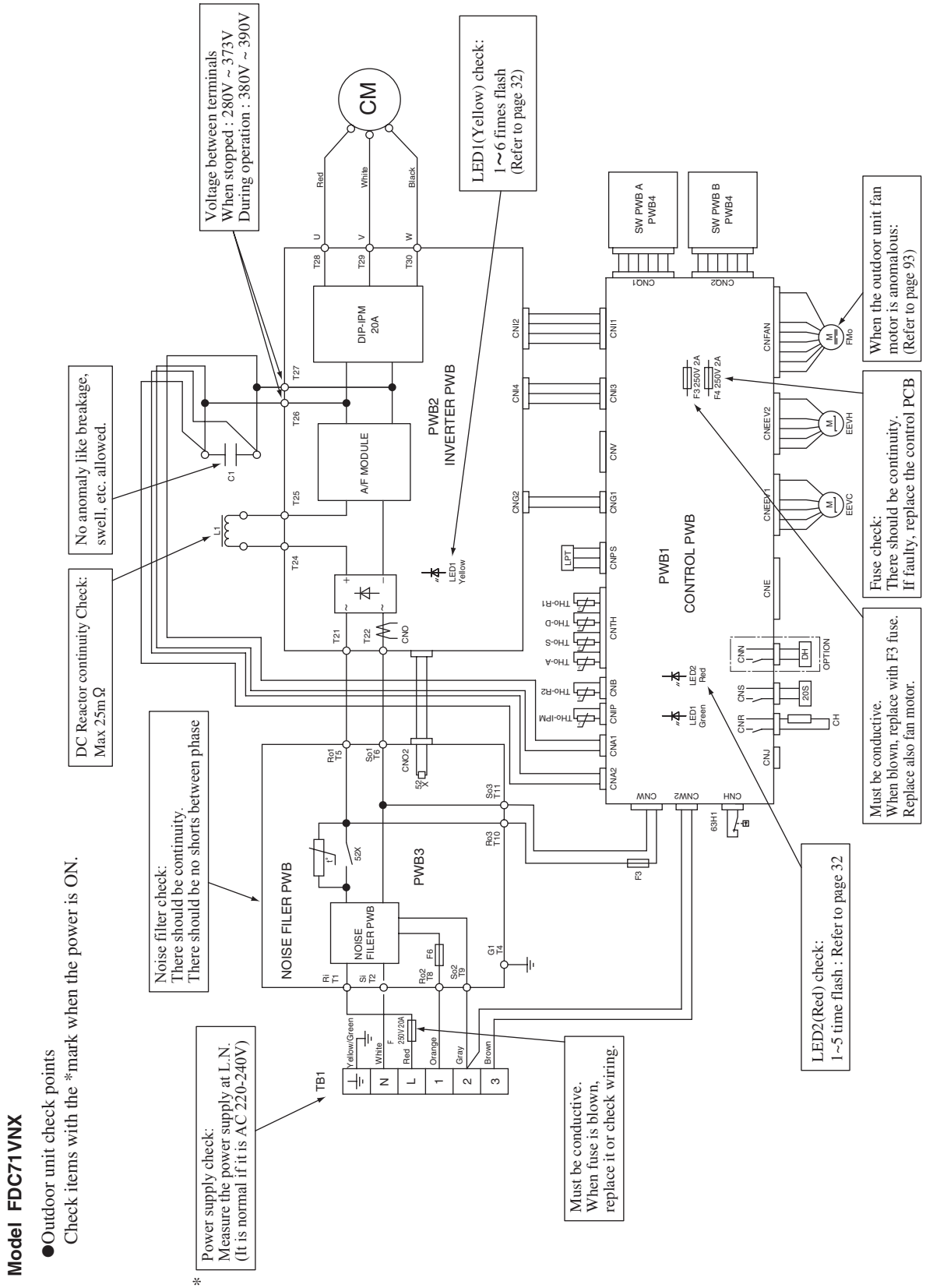



Connect to the terminal of the wires which are disconnected from compressor.

**LED ON/OFF pattern**

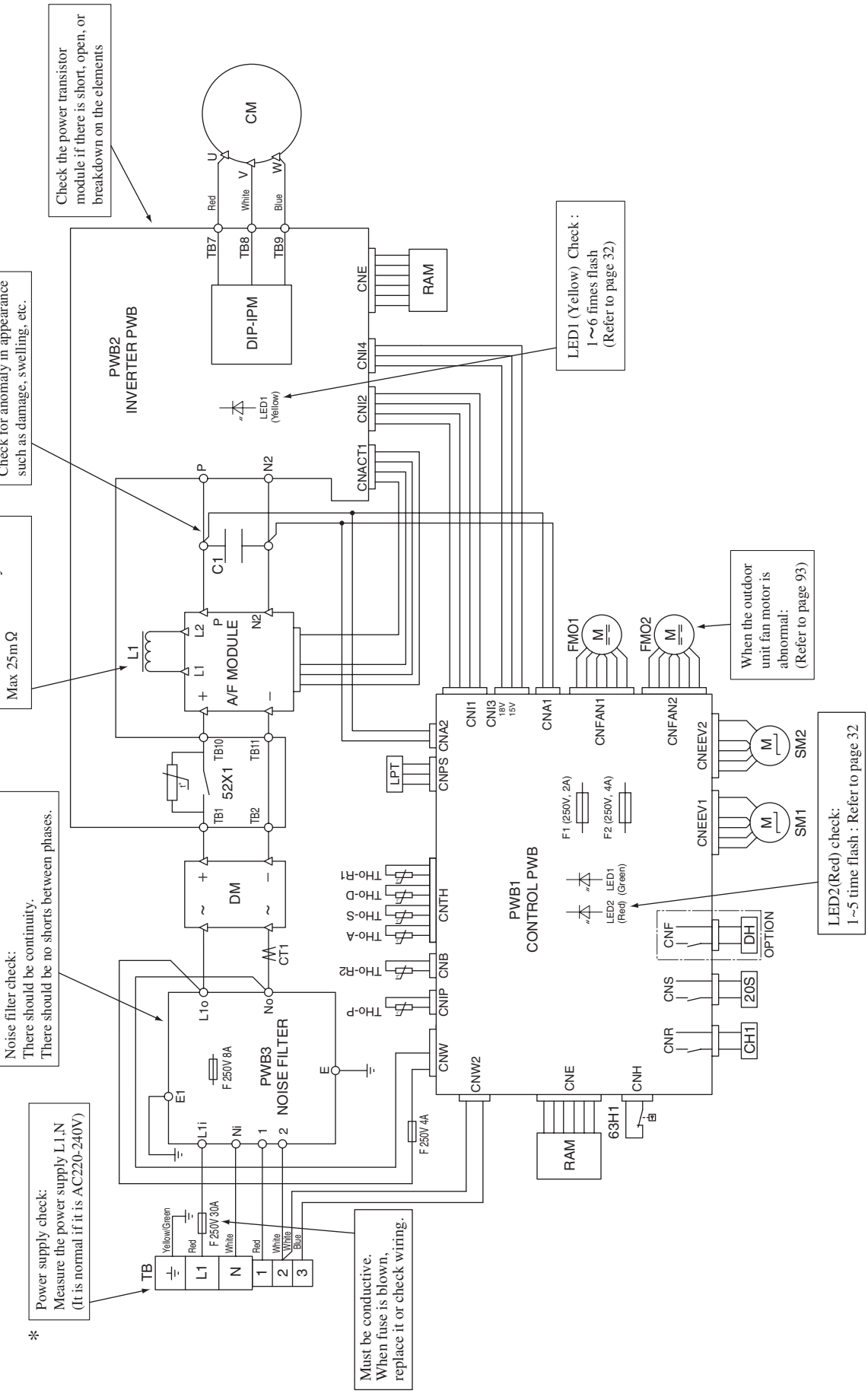


### (9) Outdoor unit controller failure diagnosis circuit diagram



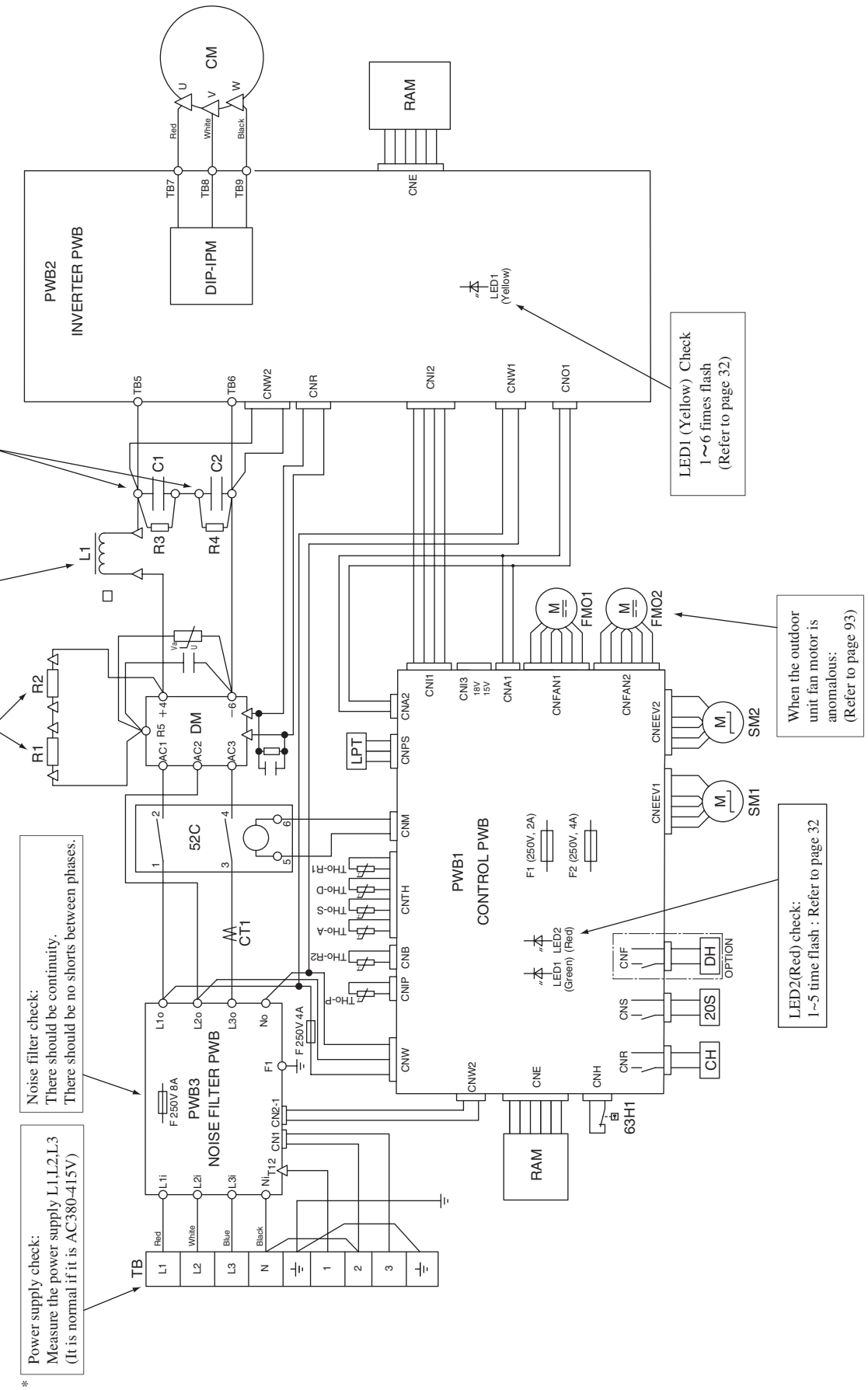
**Models FDC100,125,140VNX**

●Outdoor unit check points
Check items with the *mark when the power is ON.


Check the power transistor module if there is short, open, or breakdown on the elements
Capacitor check: Check for anomaly in appearance such as damage, swelling, etc.
DC Reactor continuity Check: Max 25mΩ
Noise filter check: There should be continuity. There should be no shorts between phases.
Power supply check: Measure the power supply L1,N (It is normal if it is AC220-240V)
Must be conductive. When fuse is blown, replace it or check wiring.
LED1 (Yellow) Check : 1~6 fimes flash (Refer to page 32)
When the outdoor unit fan motor is abnormal: (Refer to page 93)
LED2(Red) check: 1~5 time flash : Refer to page 32
PWB2 INVERTER PWB
PWB1 CONTROL PWB
PWB3 NOISE FILTER
DIP-IPM
A/F MODULE
DM
52X1
CM
RAM
63H1
F 250V 8A
F 250V 4A
F 250V 30A
F1 (250V, 2A)
F2 (250V, 4A)
LED1 (Green)
LED2 (Red)
OPTION

**FDC100,125,140VSX**

●Outdoor unit check points
Check items with the *mark when the power is ON.



## 2.2 Troubleshooting flow

### (1) List of troubles

| No. | Remote controller display | Description of trouble | Reference page |
|---|---|---|---|
| 1 | None | Operates but does not cool. | 55 |
| 2 | None | Operates but does not heat. | 56 |
| 3 | None | Earth leakage breaker activated | 57 |
| 4 | None | Excessive noise/vibration (1/3) | 58 |
| 5 | None | Excessive noise/vibration (2/3) | 59 |
| 6 | None | Excessive noise/vibration (3/3) | 60 |
| 7 | None | Louver motor failure (FDT, FDTC and FDEN series) | 61 |
| 8 | None | Power supply system error (Power supply to indoor control PCB) | 62 |
| 9 | None | Power supply system error (Power supply to remote controller) | 63 |
| 10 | INSPECT I/U | INSPECT I/U (When 1 or 2 remote controllers are connected) | 64 |
| 11 | INSPECT I/U | INSPECT I/U (Connection of 3 units or more remote controllers) | 65 |
| 12 | WAIT | Communication error at initial operation | 66~68 |
| 13 | None | No display | 69 |
| 14 | E1 | Remote controller communication circuit error | 70 |
| 15 | E5 | Communication error during operation | 71 |
| 16 | E6 | Indoor heat exchanger temperature thermistor anomaly | 72 |
| 17 | E7 | Return air temperature thermistor anomaly | 73 |
| 18 | E8 | Heating overload operation | 74 |
| 19 | E9 | Drain trouble (FDT, FDTC, FDU and FDUM series) | 75 |
| 20 | E10 | Excessive number of connected indoor units (more than 17 units) by controlling with one remote controller | 76 |
| 21 | E14 | Communication error between master and slave indoor units | 77 |
| 22 | E16 | Indoor fan motor anomaly (In case of FDTC, FDT and SRK series) | 78 |
| 23 | E19 | Indoor unit operation check, drain motor check setting error | 79 |
| 24 | E28 | Remote controller temperature thermistor anomaly | 80 |
| 25 | E34 | Open L3 phase on power supply (3-phase model only) | 81 |
| 26 | E35 | Cooling overload operation | 82 |
| 27 | E36 | Discharge pipe temperature error | 83 |
| 28 | E37 | Outdoor heat exchanger temperature thermistor anomaly | 84 |
| 29 | E38 | Outdoor air temperature thermistor anomaly | 85 |
| 30 | E39 | Discharge pipe temperature thermistor anomaly | 86 |
| 31 | E40 | High pressure error (63H1 activated) | 87 |
| 32 | E41 | Power transistor overheat (Single phase model only) | 88 |
| 33 | E42 | Current cut | 89, 90 |
| 34 | E45 | Inverter communication error | 91 |
| 35 | E47 | Inverter PCB A/F module anomaly (Model FDC 71 only) | 92 |
| 36 | E48 | Outdoor fan motor anomaly | 93 |
| 37 | E49 | Low pressure error or low pressure sensor anomaly | 94, 95 |
| 38 | E51 | Inverter and fan motor anomaly | 96 |
| 39 | E53 | Suction pipe temperature thermistor anomaly | 97 |
| 40 | E54 | Low pressure sensor anomaly | 98 |
| 41 | E57 | Insufficient refrigerant amount or detection of service valve closure | 99 |
| 42 | E59 | Compressor startup failure | 100 |

### (2) Troubleshooting

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: None | Indoor | Keeps flashing | Stays OFF | Operates but does not cool |
| | Outdoor | Keeps flashing | Stays OFF | |

## 1. Applicable model

All models

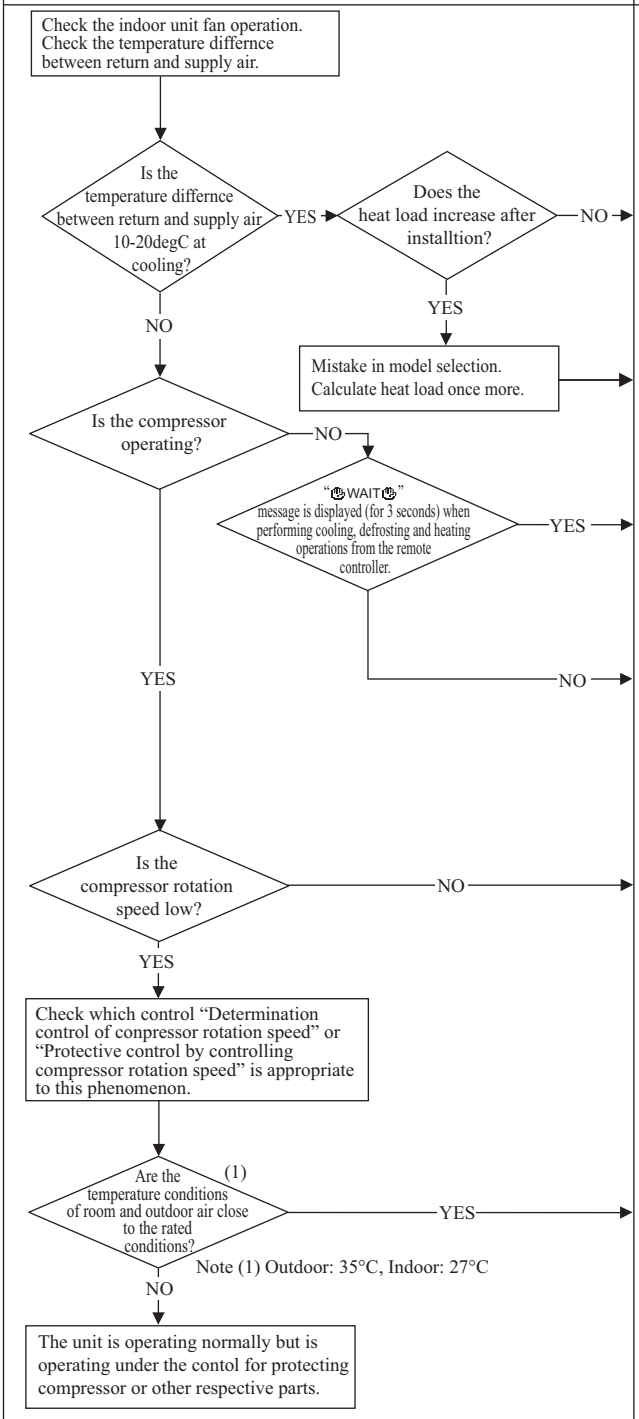
## 2. Error detection method

## 3. Condition of Error displayed

## 4. Presumable cause

- Poor compression of compressor
- Faulty expansion valve operation

## 5. Troubleshooting


Diagnosis
Countermeasure
Check the indoor unit fan operation. Check the temperature differnce between return and supply air.
Is the temperature differnce between return and supply air 10-20degC at cooling?
YES
Does the heat load increase after installtion?
NO
YES
NO
Mistake in model selection. Calculate heat load once more.
Is the compressor operating?
NO
"WAIT" message is displayed (for 3 seconds) when performing cooling, defrosting and heating operations from the remote controller.
YES
NO
YES
Is the compressor rotation speed low?
NO
YES
Check which control "Determination control of conpressor rotation speed" or "Protective control by controlling compressor rotation speed" is appropriate to this phenomenon.
Are the temperature conditions of room and outdoor air close to the rated conditions? (1)
YES
Note (1) Outdoor: 35°C, Indoor: 27°C
NO
The unit is operating normally but is operating under the contol for protecting compressor or other respective parts.
It is normal.
(This unit is designed to start in the soft start mode by detecting the under dome temperature of compressor when it restart after power reset.
It is necessary to replace to higher capacity one or to install additional unit.
Compressor refrigerant oil protection control at starting is activated. For the contents of control, refer to the compressor start control of the microcomputer control functions.
Compressor may be stopped by the error detection control. For the contents of control, refer to anomalous stop control by controlling compressor rotation speed of microcomputor control functions.
Inspect the followings.
• Minor clogging of filter
• Minor clogging of heat exchanger
• Minor short-circuit
• Minor shortage of refrigerant amount
• Poor compression of compressor
Considering appropriate operation control, check suspicious points.
Inspect the followings for reference.
• Major clogging of filter
• Major clogging of heat exchanger
• Major short-circuit
• Major shortage of refrigerant amount
• Compressor protection ON
• Indoor fan tap
• Valid setting of silent mode

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: None | Indoor | Keeps flashing | Stays OFF | Operates but does not heat |
| | Outdoor | Keeps flashing | Stays OFF | |

## 1. Applicable model

All models

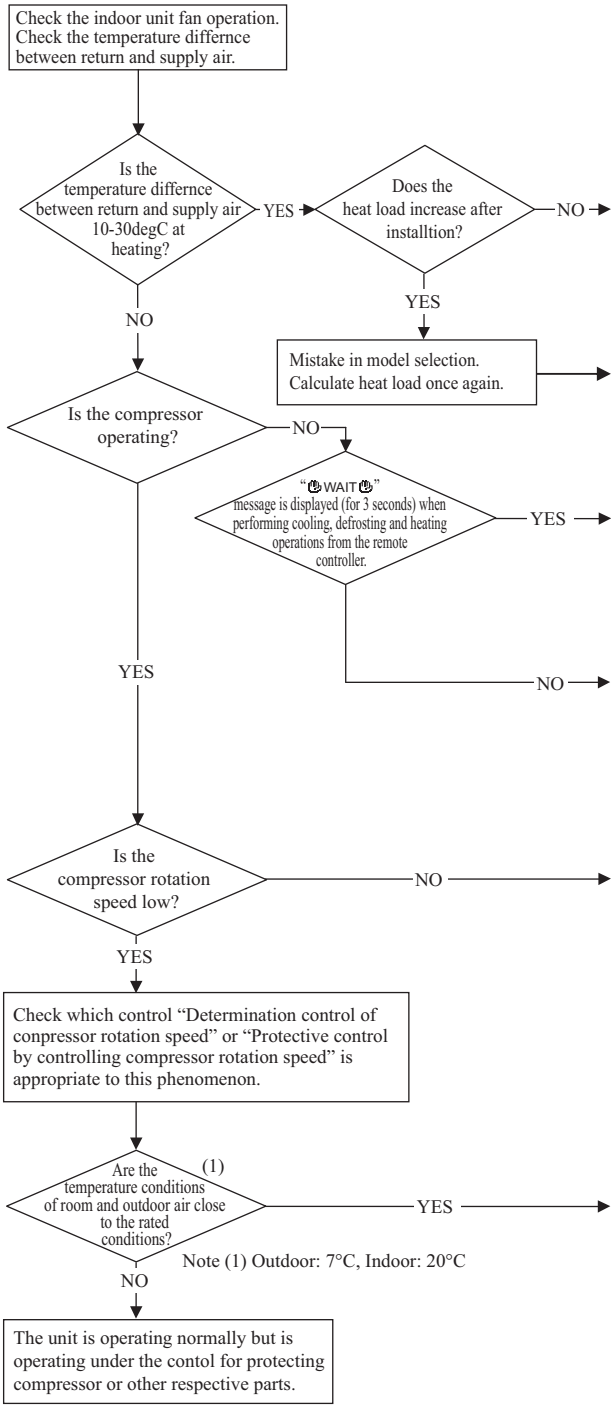
## 2. Error detection method

## 3. Condition of Error displayed

## 4. Presumable cause

- Faulty 4-way valve operation
- Poor compression of compressor
- Faulty expansion valve operation

## 5. Troubleshooting


Check the indoor unit fan operation. Check the temperature differnce between return and supply air.
Is the temperature differnce between return and supply air 10-30degC at heating?
YES
Does the heat load increase after installtion?
NO
YES
Mistake in model selection. Calculate heat load once again.
NO
Is the compressor operating?
NO
"WAIT" message is displayed (for 3 seconds) when performing cooling, defrosting and heating operations from the remote controller.
YES
NO
YES
Is the compressor rotation speed low?
NO
YES
Check which control "Determination control of conpressor rotation speed" or "Protective control by controlling compressor rotation speed" is appropriate to this phenomenon.
Are the temperature conditions of room and outdoor air close to the rated conditions?
(1)
YES
Note (1) Outdoor: 7°C, Indoor: 20°C
NO
The unit is operating normally but is operating under the contol for protecting compressor or other respective parts.

| Diagnosis | Countermeasure |
|---|---|
| Check the indoor unit fan operation. Check the temperature differnce between return and supply air. | |
| Is the temperature differnce between return and supply air 10-30degC at heating? YES → Does the heat load increase after installtion? NO → | It is normal. (This unit is designed to start in the soft start mode by detecting the under dome temperature of compressor when it restart after power reset. |
| Does the heat load increase after installtion? YES → Mistake in model selection. Calculate heat load once again. | It is necessary to replace to higher capacity one or to install additional unit. |
| Is the compressor operating? NO → "WAIT" message is displayed (for 3 seconds) when performing cooling, defrosting and heating operations from the remote controller. YES → | Compressor refrigerant oil protection control at starting is activated. For the contents of control, refer to the compressor start control of the microcomputer control functions. |
| Is the compressor operating? YES → / "WAIT" message is displayed (for 3 seconds) when performing cooling, defrosting and heating operations from the remote controller. NO → | Compressor may be stopped by the error detection control. For the contents of control, refer to anomalous stop control by controlling compressor rotation speed of microcomputor control functions. |
| Is the compressor rotation speed low? NO → | Inspect the followings.<br>• Minor clogging of filter<br>• Minor clogging of heat exchanger<br>• Minor short-circuit<br>• Minor shortage of refrigerant amount<br>• Poor compression of compressor |
| Is the compressor rotation speed low? YES → Check which control "Determination control of conpressor rotation speed" or "Protective control by controlling compressor rotation speed" is appropriate to this phenomenon. | |
| Are the temperature conditions of room and outdoor air close to the rated conditions? (1) YES → Note (1) Outdoor: 7°C, Indoor: 20°C | Considering appropriate operation control, check suspicious points. Inspect the followings for reference.<br>• Major clogging of filter<br>• Major clogging of heat exchanger<br>• Major short-circuit<br>• Major shortage of refrigerant amount<br>• Compressor protection ON<br>• Indoor fan tap<br>• Valid setting of silent mode |
| Are the temperature conditions of room and outdoor air close to the rated conditions? NO → The unit is operating normally but is operating under the contol for protecting compressor or other respective parts. | |

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: None | Indoor | Stays OFF | Stays OFF | Earth leakage breaker activated |
| | Outdoor | Stays OFF | Stays OFF | |

## 1. Applicable model

All models

## 2. Error detection method

## 3. Condition of Error displayed

## 4. Presumable cause

• Defective compressor
• Noise

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| Are OK the insulation resistance and coil resistance of compressor? — NO | Replace compressor.* |
| Is insulation of respective harnesses OK? Is any harness bitten between pannel and casing or etc? — NO | Secure insulation resistance. |
| Check the outdoor unit grounding wire/earth leakage breaker. | |

Check of the outdoor unit grounding wire/earth leakage breaker

① Run an independent grounding wire from the grounding screw of outdoor unit to the grounding terminal on the distribution panel. (Do not connect to another grounding wire.)
② In order to prevent malfunction of the earth leakage breaker itself, confirm that it is conformed to higher harmonic regulation.

* Insulation resistance of compressor
• Immediately after installation or when the unit has been left for long time without power supply, the insulation resistance may drop to a few MΩ because of refrigerant migrated in the compressor.
When the earth breaker is activated at lower insulation resistance, check the following points.
① 6 hours after power ON, check if the insulation resistance recovers to normal.
When power ON, crankcase heater heat up compressor and evaporate the refrigerant migrated in the compressor.
② Check if the earth leakage breaker is conformed to higher harmonic regulation or not.
Since the unit is equipped with inverter, it is necessary to use components conformed to higher harmonic regulation in order to prevent malfunction of earth leakage breaker.

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: None | Indoor | – | – | Excessive noise/vibration (1/3) |
| | Outdoor | – | – | |

## 1.Applicable model

All models

## 2.Error detection method

## 3. Condition of Error displayed

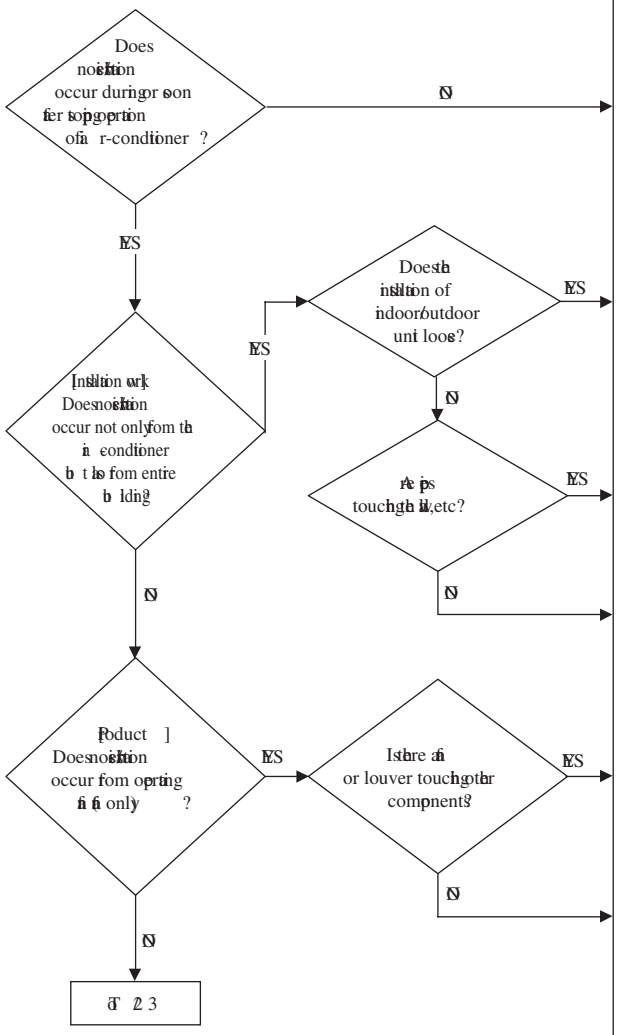
## 4.Presumable cause

① Improper installation work
- Improper anti-vibration work at instllation
- Insufficient strength of mounting face

② Defective product
- Before/after shipping from factory

③ Improper adjustment during commissioning
- Excess/shortage of refrigerant, etc.

## 5.Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
|  | If excessive noise/vibration persists when sufficient time has elapsed after stopping the unit, it is considered that the air-conditioner is not the source.<br><br>Check the installed condition carefully, and correct the position or insert rubber cushions or others into the gap, if necessary.<br><br>Prevent the vibration from transmitting to wall and etc by fixing pipes on the wall or wrapping rubber cushion around the pipe which goes through the hole in the wall or applying other appropriate means.<br><br>Strength of ceiling wall, floor, etc. may be insufficient. Review the installing position or reinforce it.<br><br>Check for leaning of installed unit or anomalous mounting of fan, louver or motor and specify the contacting point and correct it.<br><br>When the heat exchanger or filter is clogged, clean them. In case that the unit is installed at the site where background noise is very low, small noise from indoor unit can be heard, but it is normal. Before installation, check for background noise. If backgound nois is very low, convince client prior to installation. |



Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: None | Indoor | – | – | Excessive noise/vibration (2/3) |
| | Outdoor | – | – | |

## 1. Applicable model

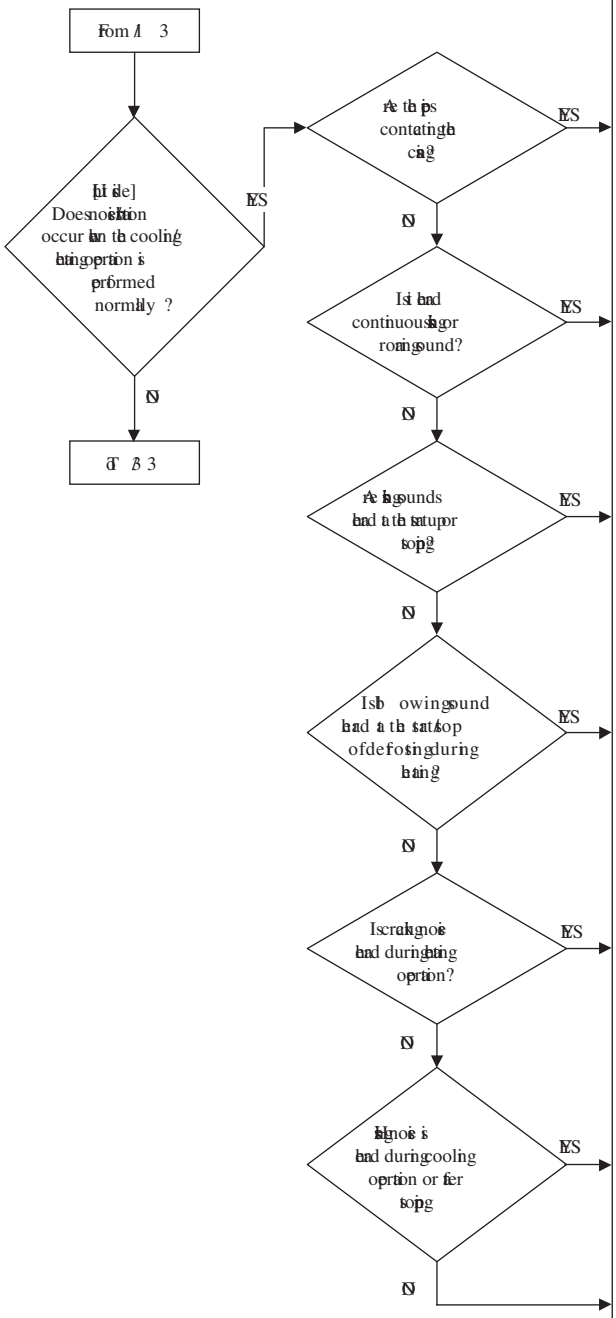
All models

## 2. Error detection method

## 3. Condition of Error displayed

## 4. Presumable cause

## 5. Troubleshooting




| Countermeasure |
|---|
| Rearrange the piping to avoid contact with the casing. |
| It is noise/vibration that is generated when the refrigerant gas or liquid flow through inside of piping of air-conditioner. It is likely to occur particularly during cooling or defrosting in the heating mode. It is normal. |
| The noise/vibration occurs when the refrigerant starts or stops flowing. It is normal. |
| When the defrosting starts or stops during heating, the refrigerant flow is reversed due to switching 4-way valve. This causes a large change in pressure which produces a blowing sound. It may accompany also the hissing sounds as mentioned above. They are normal. |
| After the start or stop of heating operation or during defrosting, abrupt changes in temperature cause resin parts to shrink or expand. This is normal. |
| It is the sound produced by the drain pump that discharges drain from the indoor unit. The pump continues to run for 5 minutes after stopping the cooling operation. This is normal. |
| Apply the damper sealant at places considered to be the sources such as the pressure reducing mechanism (expansion valve), capillary, etc. |

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: None | Indoor | – | – | Excessive noise/vibration (3/3) |
| | Outdoor | – | – | |

## 1. Applicable model

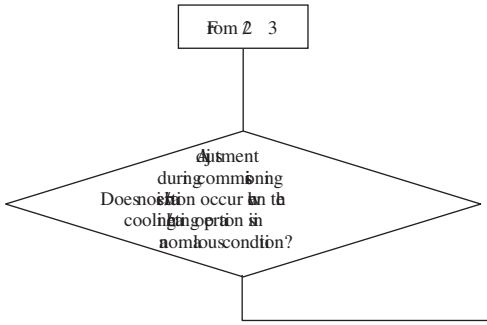
All models

## 2. Error detection method

## 3. Condition of Error displayed

## 4. Presumable cause

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
|  | If insufficient cooling/ heating problem happens due to anomalous operating conditions at cooling/ heating, followings are suspicious.<br>• Overcharge of refrigerant<br>• Insufficient charge of refrigerant<br>• Intrusion of air, nitrogen, etc.<br><br>In such occasion, it is necessary to recover refrigerant, vacuum-dry and recharge refrigerant.<br><br>* Since there could be many causes of noise/ vibration, the above do not cover all.<br>In such case, check the conditions when, where, how the noise/vibration occurs according to following check point.<br><br>• Indoor/outdoor unit<br>• Cooling/heating/fan mode<br>• Startup/stop/during operation<br>• Operating condition (Indoor/outdoor temperatures, pressure)<br>• Time it occurred<br>• Operation data retained by the remote controller such as compressor rotation speed, heat exchanger temperature, EEV opening degree, etc.<br>• Tone (If available, record the noise)<br>• Any other anomalies |

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: None | Indoor | Keeps flashing | Stays OFF | Louver motor failure (FDT, FDTC and FDEN series) |
| | Outdoor | Keeps flashing | Stays OFF | |

## 1.Applicable model

FDT, FDTC and FDEN series only

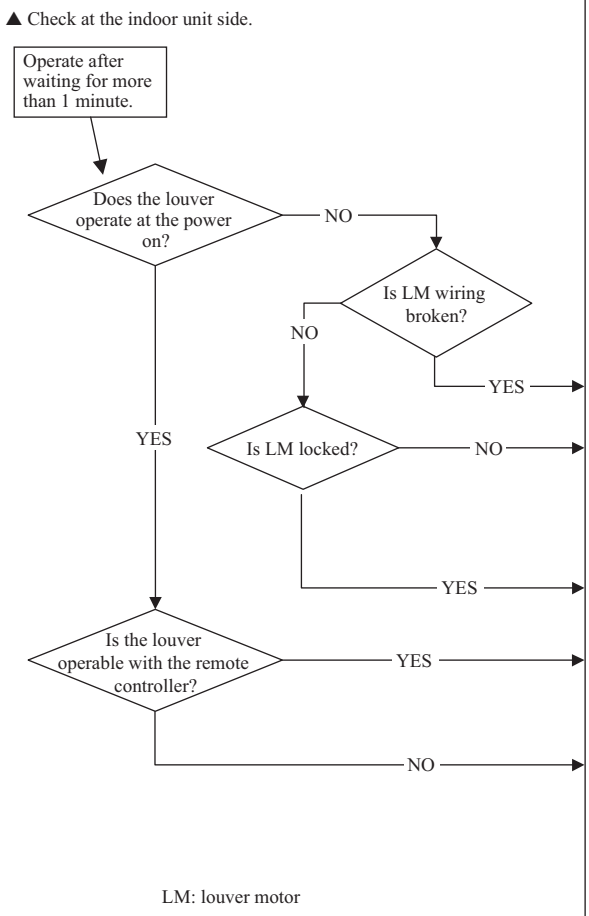
## 2. Error detection method

## 3. Condition of Error displayed

## 4. Presumable cause

- Defective LM
- LM wire breakage
- Faulty indoor control PCB

## 5. Troubleshooting




LM: louver motor

Note:

Error code

Remote controller: None

| LED | Green | Red |
|---|---|---|
| Indoor | Stays OFF | Stays OFF |
| Outdoor | Stays OFF | 2 times flash |

Content: Power supply system error (Power supply to indoor control PCB)

## 1. Applicable model

All models

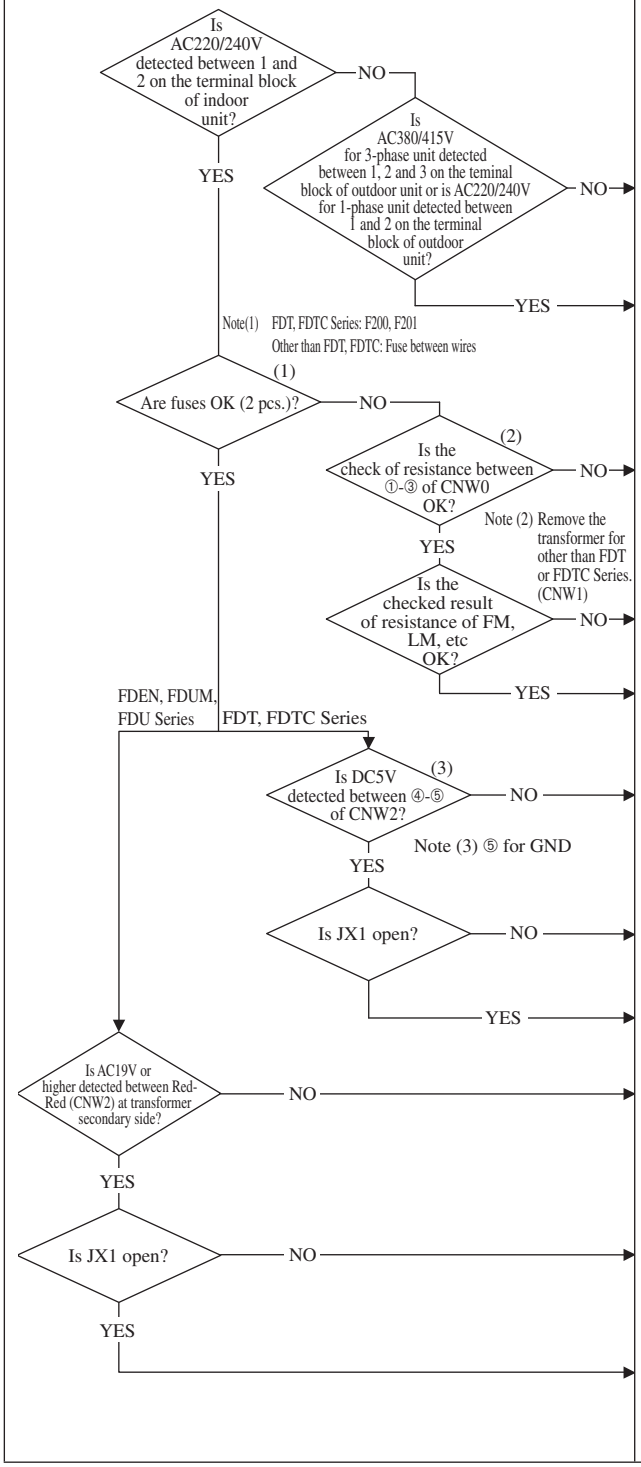
## 2. Error detection method

## 3. Condition of Error displayed

## 4. Presumable cause

- Misconnection or breakage of connecting wires
- Blown fuse
- Faulty transformer
- Faulty indoor control or power PCB
- Broken harness
- Faulty outdoor control PCB (Noise filter)

## 5. Troubleshooting


Diagnosis
Countermeasure
Is AC220/240V detected between 1 and 2 on the terminal block of indoor unit?
NO
YES
Is AC380/415V for 3-phase unit detected between 1, 2 and 3 on the teminal block of outdoor unit or is AC220/240V for 1-phase unit detected between 1 and 2 on the terminal block of outdoor unit?
NO
Defective outdoor control PCB (Noise filter)
YES
Misconnection or breakage of connecting wires
Note(1) FDT, FDTC Series: F200, F201
Other than FDT, FDTC: Fuse between wires
(1)
Are fuses OK (2 pcs.)?
NO
YES
(2)
Is the check of resistance between ①-③ of CNW0 OK?
NO
Defective indoor control or power PCB → Replace.
YES
Note (2) Remove the transformer for other than FDT or FDTC Series. (CNW1)
Is the checked result of resistance of FM, LM, etc OK?
NO
Replace FM, LM, etc.
YES
Replace fuse.
FDEN, FDUM, FDU Series
FDT, FDTC Series
(3)
Is DC5V detected between ④-⑤ of CNW2?
NO
Defective indoor power PCB → Replace.
Note (3) ⑤ for GND
YES
Is JX1 open?
NO
Open JX1.
YES
Defective indoor control PCB → Replace.
Is AC19V or higher detected between Red-Red (CNW2) at transformer secondary side?
NO
Replace transformer.
YES
Is JX1 open?
NO
Open JX1.
YES
Defective indoor control PCB → Replace.

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: None | Indoor | Keeps flashing | Stays OFF | Power supply system error (Power supply to remote controller) |
| | Outdoor | Keeps flashing | 2 times flash | |

## 1. Applicable model

All models

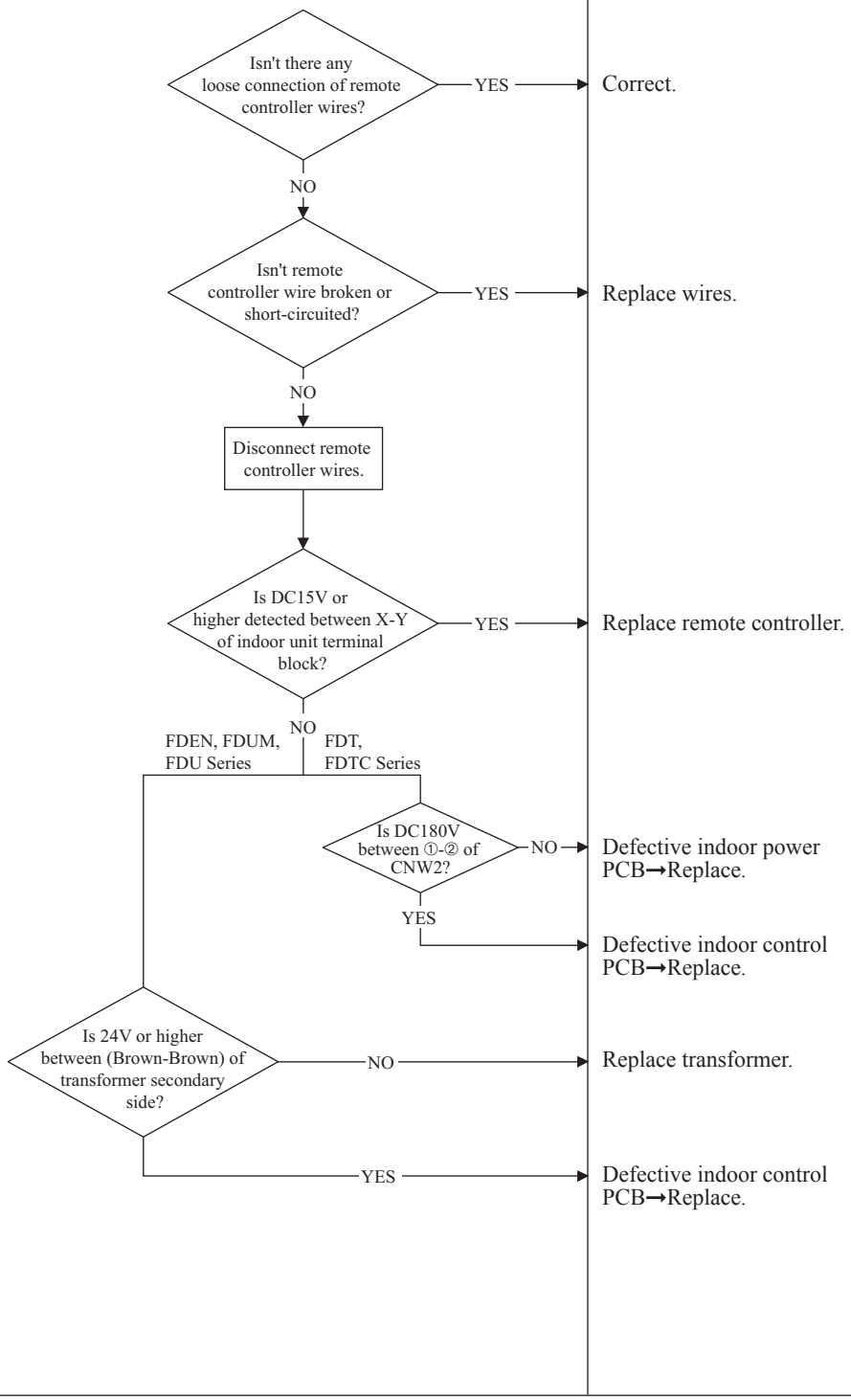
## 2. Error detection method

## 3. Condition of Error displayed

## 4. Presumable cause

- Remote controller wire breakage/short-circuit
- Defective remote controller
- Malfunction by noise
- Faulty indoor power PCB
- Broken harness
- Faulty indoor control PCB

## 5. Troubleshooting




Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: INSPECT I/U | Indoor | Keeps flashing | Stays OFF | INSPECT I/U (When 1 or 2 remote controllers are connected) |
| | Outdoor | Keeps flashing | 2 times flash | |

## 1. Applicable model

All models

## 2. Error detection method

Communication between indoor unit and remote controller is disabled for more than 30 minutes after the power on.

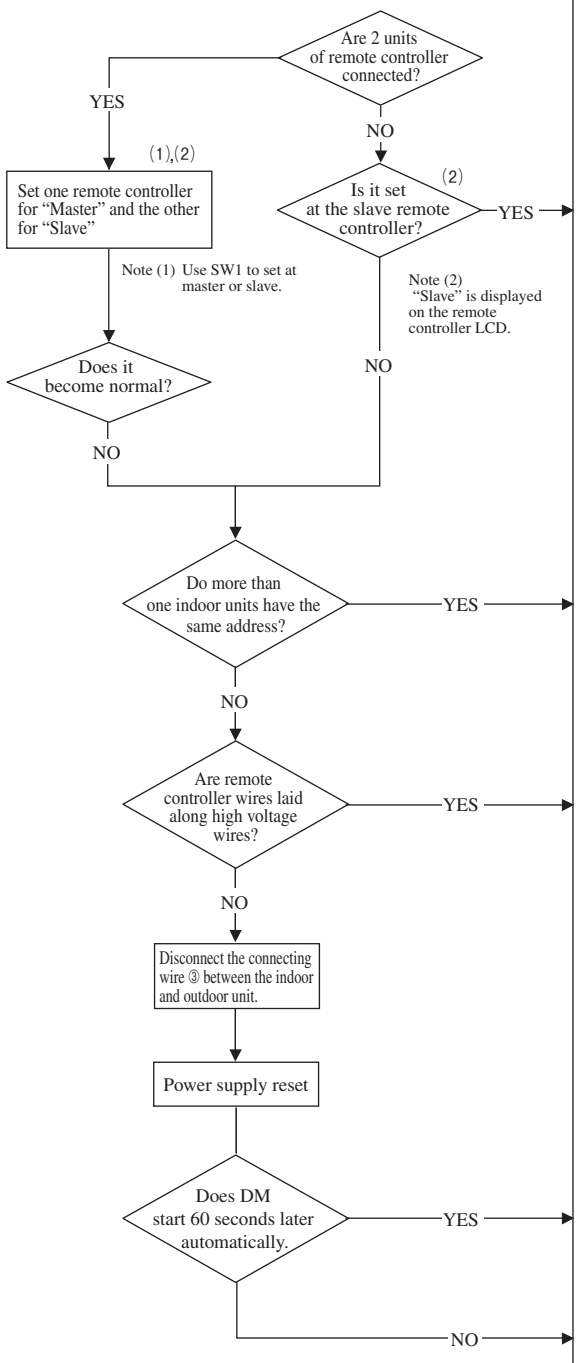
## 3. Condition of Error displayed

Same as above

## 4. Presumable cause

- Improper setting
- Surrounding environment
- Defective remote controller communication circuit
- Faulty indoor control PCB

## 5. Troubleshooting


Diagnosis
Countermeasure
Are 2 units of remote controller connected?
YES
NO
(1),(2)
Set one remote controller for "Master" and the other for "Slave"
(2)
Is it set at the slave remote controller?
YES
Set SW1 on remote controller PCB at "Master".
Note (1) Use SW1 to set at master or slave.
Note (2) "Slave" is displayed on the remote controller LCD.
Does it become normal?
NO
NO
Do more than one indoor units have the same address?
YES
Set address again. (SW2 on indoor control PCB)
NO
Are remote controller wires laid along high voltage wires?
YES
Separate remote controller wires from high voltage wires.
NO
Disconnect the connecting wire ③ between the indoor and outdoor unit.
Power supply reset
Does DM start 60 seconds later automatically.
YES
Defective indoor control PCB→Replace.
NO
Defective remote controller →Change.

Note: If any error is detected 30 minutes after displaying "WAIT" on the remote controller, the display changes to "INSPECT I/U".

| Error code | ED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: INSPECT I/U | Indoor | Keeps flashing | Stays OFF | INSPECT I/U (Connection of 3 units or more remote controller) |
| | Outdoor | Keeps flashing | 2 times flash | |

## 1. Applicable model

All models

## 2. Error detection method

Indoor unit cannot communicate for more than 30 minutes after the power on with remote controller.

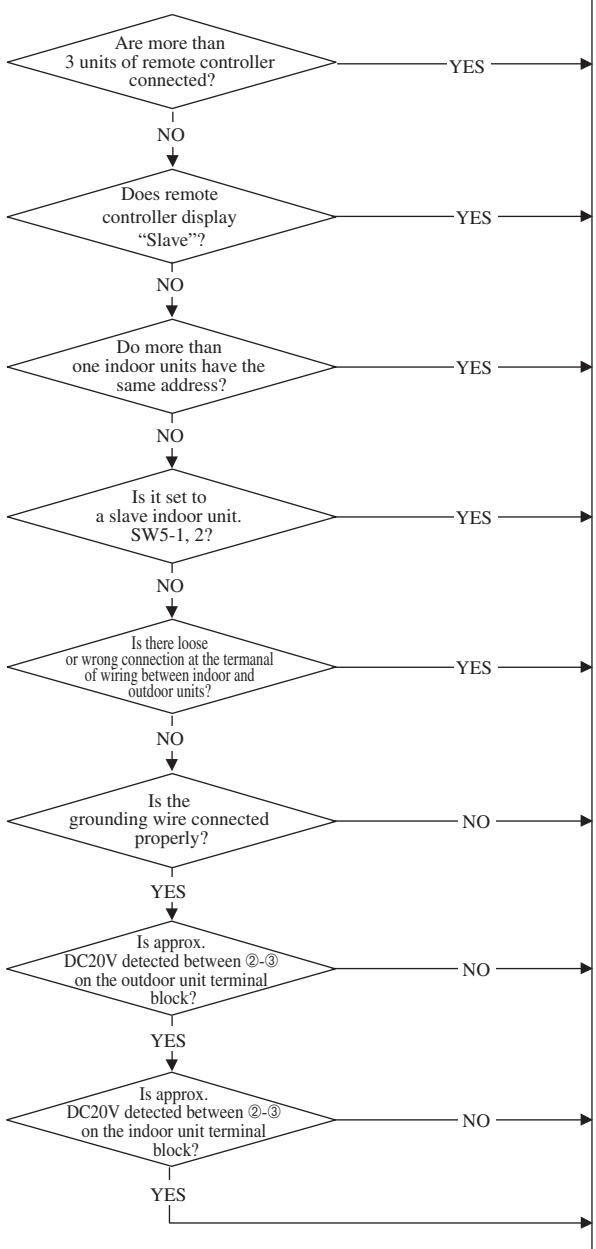
## 3. Condition of Error displayed

Same as above

## 4. Presumable cause

- Improper setting
- Surrounding environment
- Defective remote controller communication circuit
- Faulty indoor control or power PCB
- Faulty outdoor control PCB

## 5. Troubleshooting


Diagnosis
Countermeasure
Are more than 3 units of remote controller connected?
YES
Reduce to 2 units or less.
NO
Does remote controller display "Slave"?
YES
Change remote controller setting to "Master". (SW1 on remote controller PCB)
NO
Do more than one indoor units have the same address?
YES
Change address. (SW2 on indoor control PCB)
NO
Is it set to a slave indoor unit. SW5-1, 2?
YES
Change to master. (SW5-1, 2 on indoor control PCB)
NO
Is there loose or wrong connection at the termanal of wiring between indoor and outdoor units?
YES
Correct
NO
Is the grounding wire connected properly?
NO
Correct
YES
Is approx. DC20V detected between ②-③ on the outdoor unit terminal block?
NO
Defective outdoor control PCB→Replace.
YES
Is approx. DC20V detected between ②-③ on the indoor unit terminal block?
NO
Broken connecting wire→ Correct.
YES
Defective indoor control or power PCB→Replace.

Note: If any error is detected 30 minutes after displaying "WAIT" on the remote controller, the display changes to "INSPECT I/U".

Error code

Remote controller: WAIT

| LED | Green | Red |
|---|---|---|
| Indoor | Keeps flashing | Stays OFF |
| Outdoor | Keeps flashing | 2 times flash |

Content

# Communication error at initial operation (1/3)

## 1. Applicable model

All models

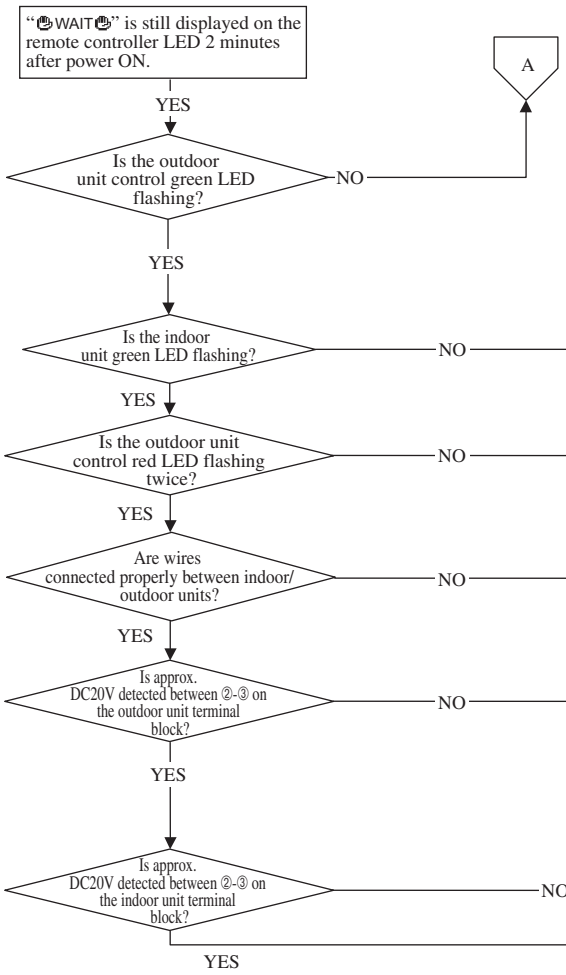
## 2. Error detection method

## 3. Condition of Error displayed

## 4. Presumable cause

- Faulty indoor control or power PCB
- Defective remote controller
- Broken remote controller wire
- Faulty outdoor control PCB
- Broken connection wires

## 5. Troubleshooting


"WAIT" is still displayed on the remote controller LED 2 minutes after power ON.
YES
Is the outdoor unit control green LED flashing?
NO
A
YES
Is the indoor unit green LED flashing?
NO
Defective indoor control PCB→Replace.
YES
Is the outdoor unit control red LED flashing twice?
NO
Defective indoor control PCB→Replace.
Defective remote controller→Replace.
Broken remote controller wire Y→Replace.
YES
Are wires connected properly between indoor/outdoor units?
NO
Correct connection wires between indoor and outdoor units.
YES
Is approx. DC20V detected between ②-③ on the outdoor unit terminal block?
NO
Defective outdoor control PCB→Replace.
YES
Is approx. DC20V detected between ②-③ on the indoor unit terminal block?
NO
Defective connection wire (Broken)
Noise
YES
Defective indoor control or power PCB→Replace.

See next page.

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: WAIT | Indoor | Keeps flashing | Stays OFF | Communication error at initial operation (2/3) |
| | Outdoor | Keeps flashing | 2 times flash | |

## 1. Applicable model

All models

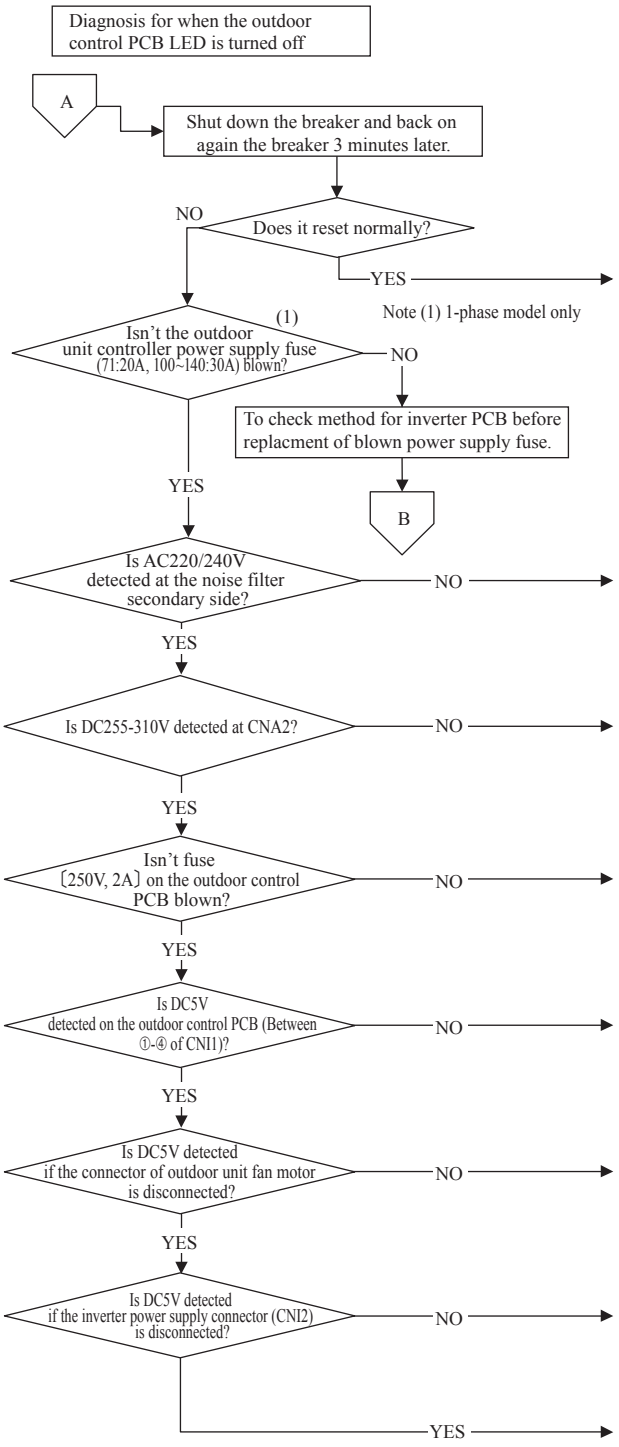
## 2. Error detection method

## 3. Condition of Error displayed

## 4. Presumable cause

- Faulty noise filter
- Faulty indoor control PCB
- Faulty outdoor control PCB
- Faulty inverter PCB
- Faulty fan motor

## 5. Troubleshooting


Diagnosis
Countermeasure
Diagnosis for when the outdoor control PCB LED is turned off
A
Shut down the breaker and back on again the breaker 3 minutes later.
NO
Does it reset normally?
YES
Normal (Malfunction by noise)
(1)
Note (1) 1-phase model only
Isn't the outdoor unit controller power supply fuse (71:20A, 100~140:30A) blown?
NO
To check method for inverter PCB before replacment of blown power supply fuse.
B
YES
See next page.
Is AC220/240V detected at the noise filter secondary side?
NO
Replace noise filter.
YES
Is DC255-310V detected at CNA2?
NO
Check connection of diode stack and electrolytic capacitor by refering main electrical circuit diagram
YES
Isn't fuse 〔250V, 2A〕on the outdoor control PCB blown?
NO
Defective outdoor control PCB→Replace.
YES
Is DC5V detected on the outdoor control PCB (Between ①-④ of CNI1)?
NO
Defective outdoor control PCB→Replace.
YES
Is DC5V detected if the connector of outdoor unit fan motor is disconnected?
NO
Defective outdoor fan motor
YES
Is DC5V detected if the inverter power supply connector (CNI2) is disconnected?
NO
Defective inverter PCB →Replace.
YES
Defective outdoor control PCB→Replace.

Note:

| Error code | ED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: WAIT | Indoor | Keeps flashing | Stays OFF | Communication error at initial operation (3/3) |
| | Outdoor | Keeps flashing | 2 times flash | |

## 1. Applicable model

All models

## 2. Error detection method

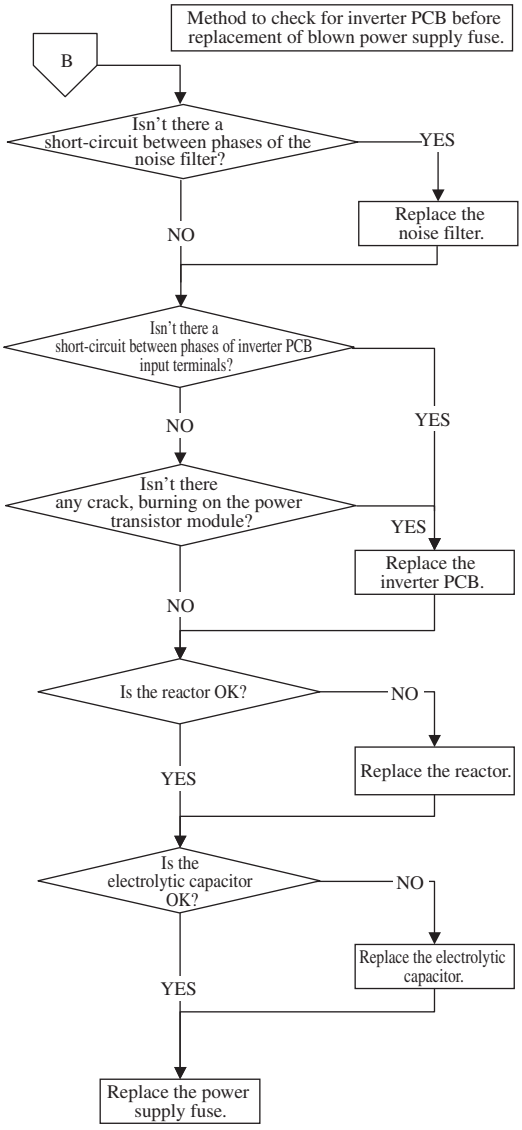
## 3. Condition of Error displayed

## 4. Presumable cause

- Blown fuse
- Faulty noise filter
- Faulty inverter PCB
- Faulty reactor
- Faulty electrolytic capacitor

## 5. Troubleshooting

### Diagnosis




### Countermeasure

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: None | Indoor | Keeps flashing | Stays OFF | No display |
| | Outdoor | Keeps flashing | 2 times flash | |

## 1. Applicable model

All models

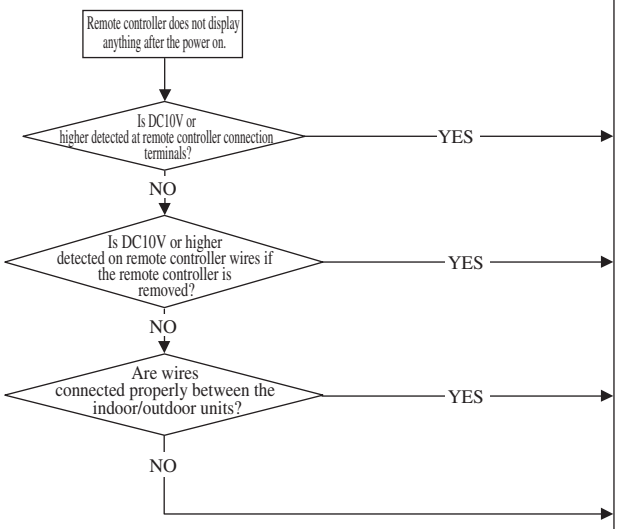
## 2. Error detection method

## 3. Condition of Error displayed

## 4. Presumable cause

- Faulty indoor control PCB
- Defective remote controller
- Broken remote controller wire

## 5. Troubleshooting


Remote controller does not display anything after the power on.
Is DC10V or higher detected at remote controller connection terminals?
YES
Defective remote controller
NO
Is DC10V or higher detected on remote controller wires if the remote controller is removed?
YES
Defective remote controller
NO
Are wires connected properly between the indoor/outdoor units?
YES
Defective connecting wire. Defective remote controller wire (Short-circuit, etc.)
NO
Defective indoor control PCB→Replace.

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E1 | Indoor | Keeps flashing | Stays OFF | Remote controller communication circuit error |
| | Outdoor | Keeps flashing | Stays OFF | |

## 1. Applicable model

All models

## 2. Error detection method

When normal communication between the remote controller and the indoor unit is interrupted for more than 2 minutes. (Detectable only with the remote controller)

## 3. Condition of Error displayed

Same as above

## 4. Presumable cause

- Defective communication circuit between remote controller-indoor unit
- Noise
- Defective remote controller
- Faulty indoor control PCB

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| Is it possible to reset normally by the power reset? → YES | Malfunction by noise Check peripheral environment. |
| NO → Turn SW7-1 to OFF. ↛ ON Remove the wire ✡ connecting between indoor/outdoor units. → Power reset → Does the drain pump restart automatically 1 minute later? → YES | Defective indoor control PCB ➞ Replace. |
| NO → Note (2) Does the remote controller still display "WAIT" even after 3 minutes? | Defective remote controller ➞ Replace. |

Note: If the indoor unit cannot communicate normally with the remote controller for 180 seconds, the indoor unit PCB starts to reset automatically.

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E5 | Indoor | Keeps flashing | 2 times flash | Communication error during operation |
| | Outdoor | Keeps flashing | See below | |

## 1. Applicable model

All models

## 2. Error detection method

When normal communication between indoor and outdoor unit is interrupted for more than 2 minutes.

## 3. Condition of Error displayed

Same as above is detected during operation.

## 4. Presumable cause

- Unit No. setting error
- Broken remote controller wire
- Faulty remote controller wire connection
- Faulty outdoor control PCB

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| In case that the outdoor unit red LED flashes 2-times | |
| Note (1) Inspect faulty connections (disconnection, looseness) on the outdoor unit terminal block. | |
| Is the connection of signal wires at the outdoor unit side OK? — NO | Repair signal wires. |
| YES | |
| Note (2) Check for faulty connection or breakage of signal wires between indoor-outdoor units. | |
| Is the connection of signal wires between indoor-outdoor units OK? — NO | Repair signal wires. |
| YES | |
| Power reset | |
| Has the remote controller LCD returned to normal state? — NO | To the diagnosis of "WAIT" |
| YES | Unit is normal. (Malfunction by temporary noise, etc.) |
| In case that the outdoor unit red LED stays OFF | |
| Power reset | |
| NO | |
| Has the remote controller LCD returned to normal state? — NO | Defective outdoor control PCB (Defective network communication circuit) → Replace. |
| YES | Unit is normal. (Malfunction by temporary noise, etc.) |

Note: Pressing the pump-down switch cancels communications between indoor and outdoor unit so that "communication error-E5" is displayed on indoor unit and remote controller, but it is normal.

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E6 | Indoor | Keeps flashing | 1 time flash | Indoor heat exchanger temperature thermistor anomaly |
| | Outdoor | Keeps flashing | Stays OFF | |

## 1. Applicable model

All models

## 2. Error detection method

Anomalously low temperature or high temperature (resistance) is detected on the indoor heat exchanger thermistor (ThI-R1, R2 or R3).

## 3. Condition of Error displayed

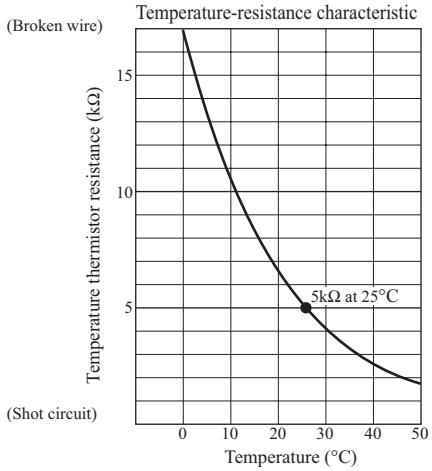
- When the temperature thermistor detects -50 (-28)°C or lower for 5 (15) seconds continuously, the compressor stops. After 3-minutes delay, the compressor starts again automatically, but if this error occurs again within 60 minutes after the initial detection.
  Note (1) Value in ( ) are for the models SRK 50, 60.
- Or if 70°C or higher is detected for 5 seconds continuously. (FDTC, FDT, FDEN, FDUM, FDU series only)

## 4. Presumable cause

- Defective indoor heat exchanger thermistor connector
- Indoor heat exchanger temperature thermistor anomaly
- Faulty indoor control PCB

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| Is the connection of indoor heat exchanger temperature thermistor connector OK? — NO | Correct. → Insert connector securely. |
| YES → Are characteristics of indoor heat exchanger temperature thermistor OK? — NO | Defective indoor heat exchanger temperature thermistor → Replace. |
| YES | Defective indoor control PCB → Replace. (Defective indoor unit heat exchanger temperature thermistor input circuit) |




Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E7 | Indoor | Keeps flashing | 1 time flash | Return air temperature thermistor anomaly |
| | Outdoor | Keeps flashing | Stays OFF | |

## 1. Applicable model

All models

## 2. Error detection method

Anomalously low temperature or high temperature (resistance) is detected by indoor return air temperature thermistor (Thi-A)

## 3. Condition of Error displayed

- When the temperature thermistor detects -50 (-45)°C or lower for 5 (15) seconds continuously, the compressor stops. After 3-minute delay, the compressor starts again automatically, but if this error occurs again within 60 minutes after the initial detection.
  Note (1) Value in ( ) are for the models SRK 50, 60.

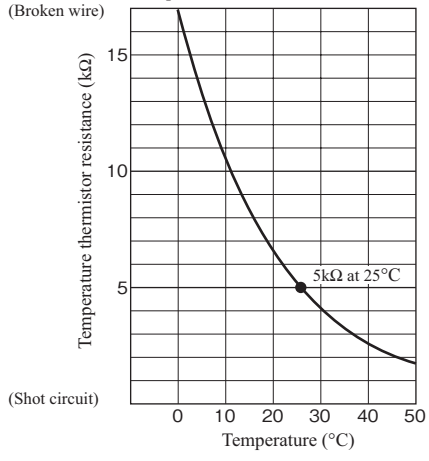
## 4. Presumable cause

- Defective return air temperature thermistor connector
- Defective return air temperature thermistor
- Faulty indoor control PCB

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| Is the connection of return air temperature thermistor connector OK? — NO | Correct. → Connect connector. |
| YES → Are the characteristics of return air temperature thermistor OK? — NO | Defective return air temperature thermistor → Replace. |
| YES | Defective indoor control PCB → Replace. (Defective return air temperature thermistor input circuit) |

Temperature-resistance characteristic




Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E8 | Indoor | Keeps flashing | 1 time flash | Heating overload operation |
| | Outdoor | Keeps flashing | Stays OFF | |

## 1. Applicable model

All models

## 2. Error detection method

Indoor heat exchanger temperature thermistor (ThI-R1, R2, R3)

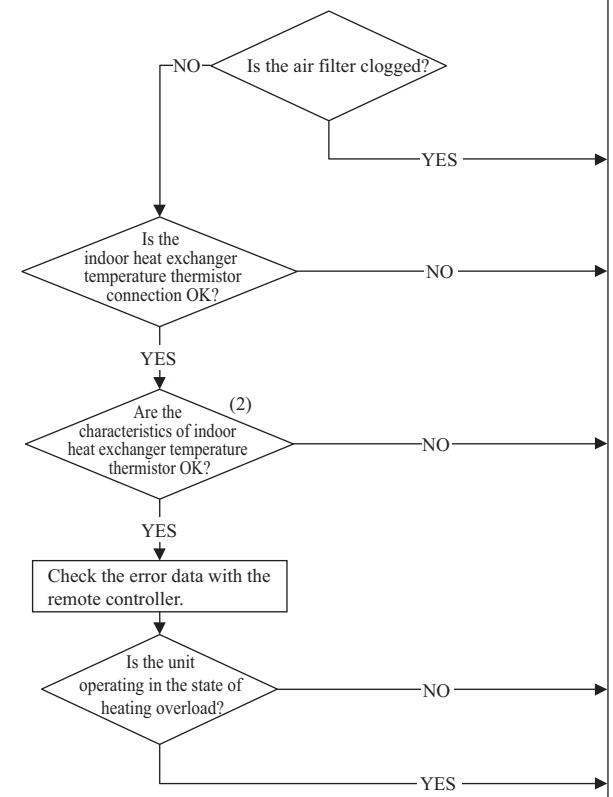
## 3. Condition of Error displayed

When it is detected 5 times within 60 minutes from initial detection or when the overload condition is detected for 6 minutes continuously.

## 4. Presumable cause

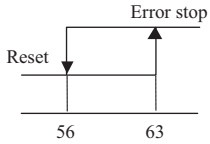
- Clogged air filter
- Defective indoor heat exchanger temperature thermistor connector
- Defective indoor heat exchanger temperature thermistor
- Anomalous refrigerant system

## 5. Troubleshooting




Note (1) Judge if it is in the state of overload or not as follows.
- Is there any short-circuit of air?
- Isn't there any fouling or clogging on the indoor heat exchanger?
- Is the outdoor fan control normal?
- Isn't the room and outdoor air temperature too high?

Note (2) For characteristics of indoor heat exchanger temperature thermistor, see the error display E6.




Note: During heating operation; After starting compressor, compressor rotation speed is decreased by detecting indoor heat exchanger temperature (Thi-R) in order to control high pressure.

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E9 | Indoor | Keeps flashing | 1 time flash | Drain trouble (FDT, FDTC, FDU, and FDUM series) |
| | Outdoor | Keeps flashing | Stays OFF | |

## 1. Applicable model

FDT, FDTC, FDU and FDUM series only

## 2. Error detection method

Float switch is activated

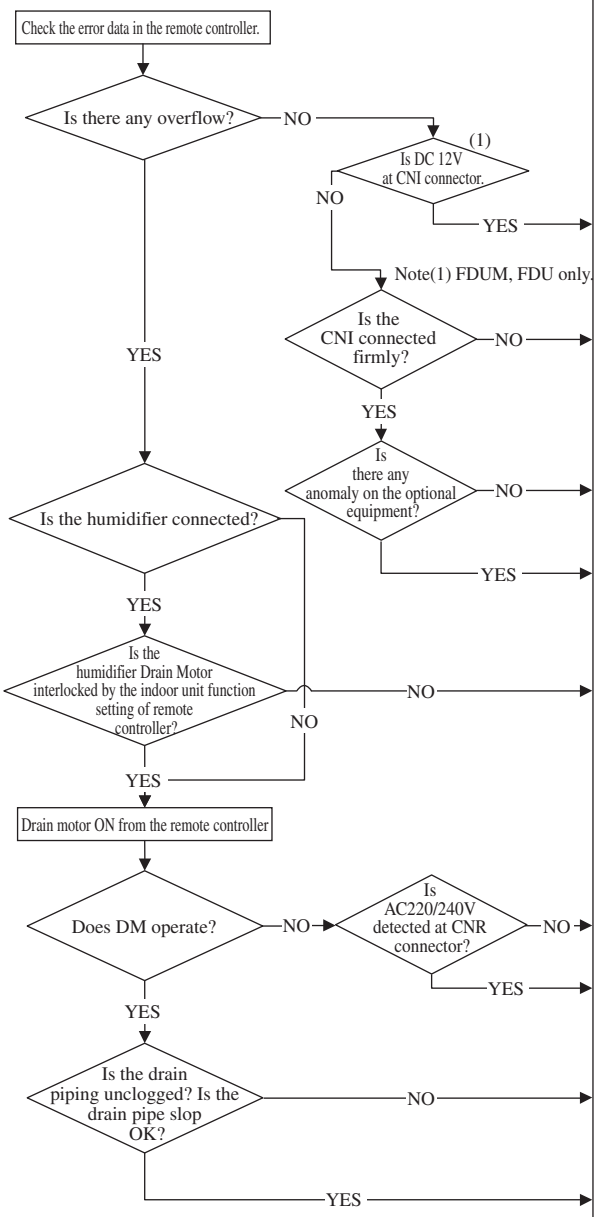
## 3. Condition of Error displayed

If the float switch OPEN is detected for 3 seconds continuously or if float switch connector or wire is disconnected.

## 4. Presumable cause

- Defective indoor control or power PCB
- Float switch setting error
- Humidifier DM interlock setting error
- Optional equipment setting error
- Drain piping error
- Defective drain motor
- Disconnection of drain motor wiring

## 5. Troubleshooting




Note: When this error occurred at power ON, disconnection of wire or connector of the float switch is suspected. Check and correct it (or replace it, if necessary).

Error code

Remote controller: E10

| LED | Green | Red |
|---|---|---|
| Indoor | Keeps flashing | Stays OFF |
| Outdoor | Keeps flashing | Stays OFF |

Content: Excessive number of connected indoor units (more than 17 units) by controlling with one remoto controller

## 1. Applicable model

All models

## 2. Error detection method

When it detects more than 17 of indoor units connected to one remote contorller

## 3. Condition of Error displayed

Same as above

## 4. Presumable cause

- Excessive number of indoor units connected
- Defective remote controller

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| Aren't more than 17 indoor units connected to one remote controller? — NO | Defective remote controller → Replace. |
| YES | Reduce to 16 or less units. |

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E14 | Indoor | Keeps flashing | 3 times flash | Communication error between master and slave indoor units |
| | Outdoor | Keeps flashing | Stays Off | |

## 1. Applicable model

All models

## 2. Error detection method

When communication error between master and slave indoor units occurs

## 3. Condition of Error displayed

Same as above

## 4. Presumable cause

- Unit address setting error
- Broken remote controller wire
- Defective remote controller wire connection
- Defective indoor control PCB

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| Is it OK the unit address setting for master and slave indoor units? → NO | Correct unit address setting. |
| Isn't the remote controller wiring between indoor units defective? → YES | Correct wiring. |
| Is it restored by resetting the power supply? → NO | Defective indoor control PCB → Replace. |
| → YES | • Malfunction by noise<br>• Check surrounding environment. |

Note (1) Set dip switches SW5-1 and SW5-2 as shown in the following table.
(Factory default setting – "Master")

| | | Indoor unit | | | |
|---|---|---|---|---|---|
| | | Master | Slave-a | Slave-b | Slave-c |
| Dip switch | SW5-1 | OFF | OFF | ON | ON |
| | SW5-2 | OFF | ON | OFF | ON |

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E16 | Indoor | Keeps flashing (-) | Stays OFF (-) | Indoor fan motor anomaly (In case of FDTC, FDT and SRK series) |
| | Outdoor | Keeps flashing | Stays OFF | |

Note (1) Value in ( ) are for the model SRK.

## 1. Applicable model

FDTC, FDT and SRK series only

## 2. Error detection method

Detected by rotation speed of indoor fan motor

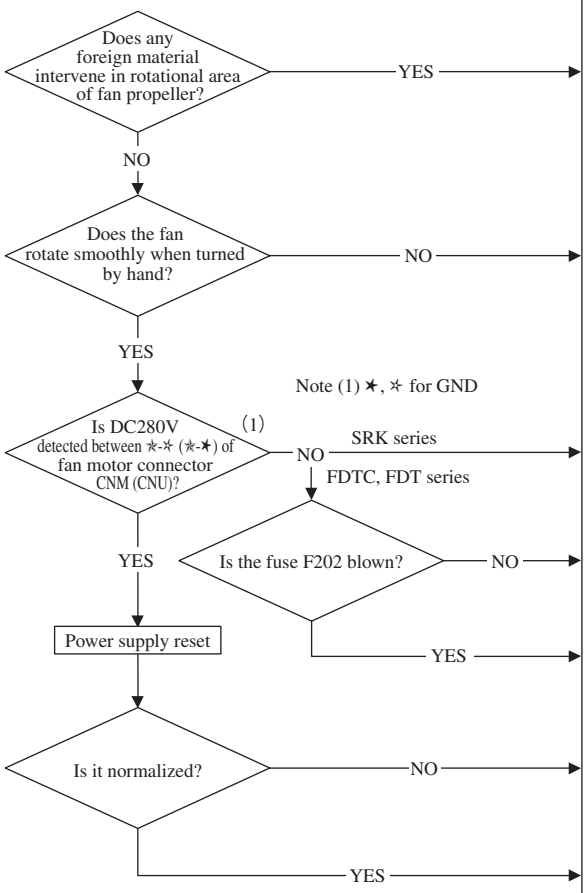
## 3. Condition of Error displayed

- When actual rotation speed of indoor fan motor drops to lower than 200rpm for 30 seconds continuously, the compressor and the indoor fan motor stop.
- After 2-seconds, it starts again automatically, but if this error occurs 4 times within 60 minutes after the initial detection. (FDTC, FDT series only)

## 4. Presumable cause

- Defective indoor power (control) PCB
- Foreign material at rotational area of fan propeller
- Defective fan motor
- Dust on control PCB
- Blown fuse
- External noise, surge

## 5. Troubleshooting




Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E19 | Indoor | Keeps flashing | 1 time flash | Indoor unit operation check, drain motor check setting error |
| | Outdoor | Keeps flashing | Stays OFF | |

## 1. Applicable model

All models

## 2. Error detection method

After indoor operation check, when the communication between indoor and outdoor unit is established and SW7-1 is still kept ON.

## 3. Condition of Error displayed

Same as above

## 4. Presumable cause

Mistake in SW7-1 setting
(Due to forgetting to turn OFF SW7-1 after indoor operation check)

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| E19 occurs when the power ON → Is SW7-1 on the indoor control PCB ON ? | |
| NO | Defective indoor control PCB (Defective SW7) →Replace |
| YES | Turn SW7-1 on the indoor control PCB OFF and reset the power |

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E28 | Indoor | Keeps flashing | Stays OFF | Remote controller temperature thermistor anomaly |
| | Outdoor | Keeps flashing | Stays OFF | |

## 1. Applicable model

All models

## 2. Error detection method

Detection of anomalously low temperature (resistance) of remote controller temperature thermistor (Thc)

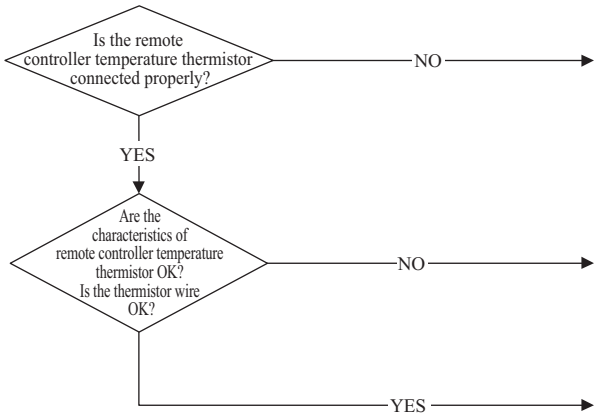
## 3. Condition of Error displayed

When the temperature thermistor detects -50°C or lower for 5 seconds continuously, the compressor stops. After 3-minutes delay, the compressor starts again automatically, but if this error occurs again within 60 minutes after the initial detection.

## 4. Presumable cause

- Faulty connection of remote controller temperature thermistor
- Defective remote controller temperature thermistor
- Defective remote controller PCB

## 5. Troubleshooting


Is the remote controller temperature thermistor connected properly?
NO
Correct.
YES
Are the characteristics of remote controller temperature thermistor OK? Is the thermistor wire OK?
NO
Defective remote controller temperature thermistor → Replace.
YES
Defective remote controller PCB → Replace. (Defective remote controller temperature thermistor input circuit)

Resistance-temperature characteristics of remote controller temperature thermistor (ThC)

| Temperature (°C) | Resistance value (kΩ) | Temperature (°C) | Resistance value (kΩ) |
|---|---|---|---|
| 0 | 65 | 30 | 16 |
| 1 | 62 | 32 | 15 |
| 2 | 59 | 34 | 14 |
| 4 | 53 | 36 | 13 |
| 6 | 48 | 38 | 12 |
| 8 | 44 | 40 | 11 |
| 10 | 40 | 42 | 9.9 |
| 12 | 36 | 44 | 9.2 |
| 14 | 33 | 46 | 8.5 |
| 16 | 30 | 48 | 7.8 |
| 18 | 27 | 50 | 7.3 |
| 20 | 25 | 52 | 6.7 |
| 22 | 23 | 54 | 6.3 |
| 24 | 21 | 56 | 5.8 |
| 26 | 19 | 58 | 5.4 |
| 28 | 18 | 60 | 5.0 |

Note: After 10 seconds has passed since remote controller thermistor was switched from valid to invalid, E28 will not be displayed even if the thermistor harness is disconnected. At same time the thermistor, which is effective, is switched from remote controller thermistor to indoor return air temperature thermistor. Even though the remote controller thermistor is set to be Effective, the return air temperature displayed on remote controller for checking still shows the value detected by indoor return air temperature thermistor, not by remote controller temperature thermistor.

Error code

Remote controller: E34

| LED | Green | Red |
|---|---|---|
| Indoor | Keeps flashing | Stays OFF |
| Outdoor | Keeps flashing | 1 time flash |

Content

# Open L3 phase on power supply
(3-phase model only)

## 1. Applicable model

3-phase model only

## 2. Error detection method

When 0V is detected on any of L1, L2, L3 for 5 seconds continuously after turning power on.

## 3. Condition of Error displayed

Same as above

## 4. Presumable cause

- Anomalous power supply
- Blown power supply fuse
- Defective noise filter
- Defective wire connection on noise filter control PCB
- Defective outdoor control PCB

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| Measure the power supply voltage. Is AC380/415V between respective phases? — NO | Check power supply. |
| YES → Is AC380/415V detected between respective phases at the secondary side of noise filter? — NO | Replace noise filter. |
| YES → Is wiring between the noise filter and the outdoor control PCB connected properly? — NO | Connect properly. |
| YES | Defective outdoor control PCB→Replace. |

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E35 | Indoor | Keeps flashing | Stays OFF | Cooling overload operation |
| | Outdoor | Keeps flashing | 1 time flash | |

## 1. Applicable model

All models

## 2. Error detection method

For the error detection method, refer to the protective control by controlling compressor rotation speed and cooling high pressure protective control of micro computer control function for corresponding models.

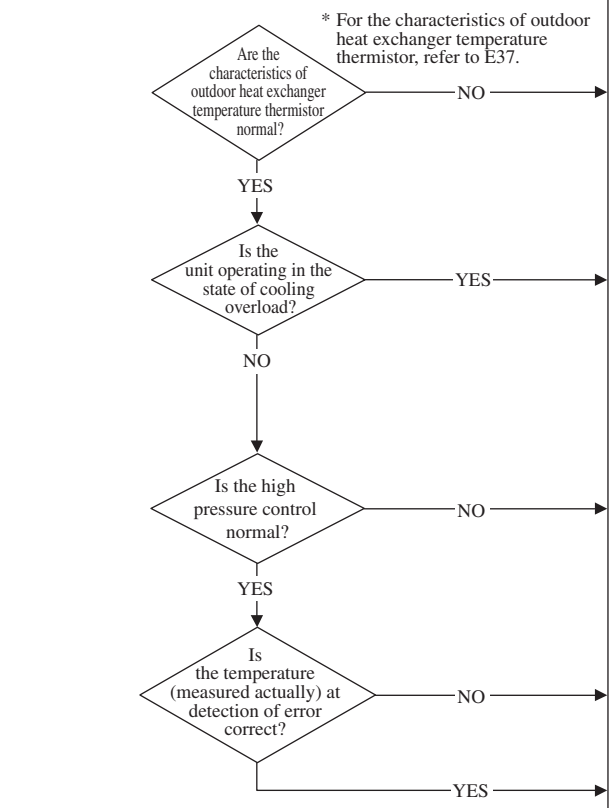
## 3. Condition of Error displayed

When outdoor heat exchanger temperature anomaly is detected 5 times within 60 minutes or this anomalous state is detected 60 minutes continuously including compressor stop.

## 4. Presumable cause

- Defective outdoor heat exchanger temperature thermistor
- Defective outdoor control PCB
- Indoor, outdoor unit installation spaces
- Short-circuit of air on indoor, outdoor units
- Fouling, clogging of heat exchanger
- Excessive refrigerant amount

## 5. Troubleshooting


Diagnosis
Countermeasure
* For the characteristics of outdoor heat exchanger temperature thermistor, refer to E37.
Are the characteristics of outdoor heat exchanger temperature thermistor normal?
NO
Replace outdoor heat exchanger temperature thermistor.
YES
Is the unit operating in the state of cooling overload?
YES
Check unit side.
• Isn't the air circulation of outdoor unit short-circuited?
• Are installation spaces adequate?
• Isn't there any fouling or clogging on heat exchanger?
NO
Is the high pressure control normal?
NO
Control operation check *
YES
Is the temperature (measured actually) at detection of error correct?
NO
Defective outdoor control PCB→Replace.
YES
Excessive refrigerant amount : Recharge refrigerant by weighing proper amount on a scale.

* For the contents of control, refer to the protective control by controlling compressor rotation speed and cooling high pressure protective control of micro computer control function for corresponding models.

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E36 | Indoor | Keeps flashing | Stays OFF | Discharge pipe temperature error |
| | Outdoor | Keeps flashing | 1 time flash | |

## 1. Applicable model

All models

## 2. Error detection method

For the error detection method, refer to the protective control by controlling compressor rotation speed and cooling high pressure protective control of micro computer control function for corresponding models.

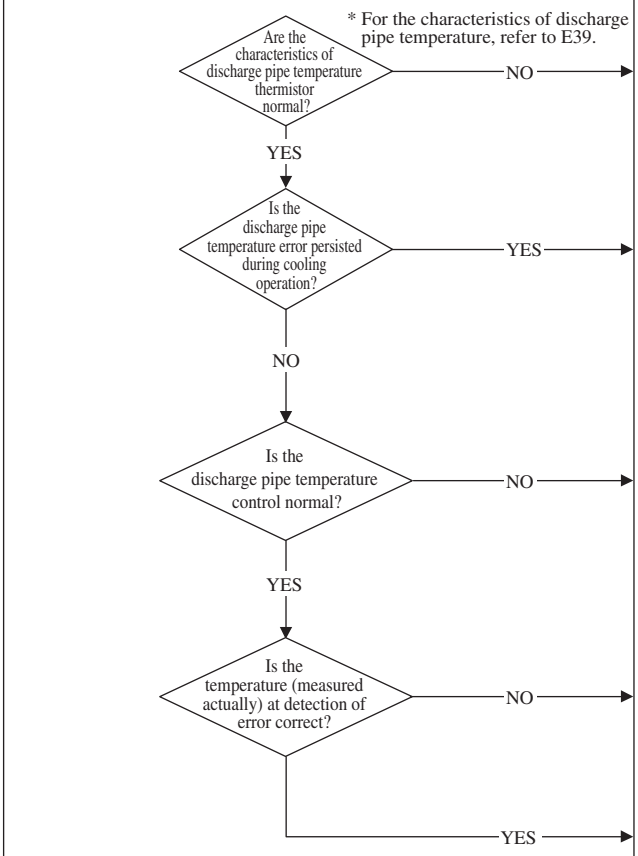
## 3. Condition of Error displayed

When discharge pipe temperature anomaly is detected 2 times within 60 minutes or this anomalous state is detected 60 minutes continuously including compressor stop.

## 4. Presumable cause

- Defective outdoor control PCB
- Defective discharge pipe temperature thermistor
- Clogged filter
- Indoor, outdoor unit installation spaces
- Short-circuit of air on indoor, outdoor units
- Fouling, clogging of heat exchanger

## 5. Troubleshooting


Diagnosis
Countermeasure
* For the characteristics of discharge pipe temperature, refer to E39.
Are the characteristics of discharge pipe temperature thermistor normal?
NO
Replace discharge pipe temperature thermistor.
YES
Is the discharge pipe temperature error persisted during cooling operation?
YES
Insufficient refrigerant amount : Recharge refrigerant by weighing proper amount on a scale.
NO
Is the discharge pipe temperature control normal?
NO
Control operation check *
YES
Is the temperature (measured actually) at detection of error correct?
NO
Defective outdoor control PCB→Replace.
YES
Check unit side:
• Isn't filter clogged?
• Are adequate indoor, outdoor unit installation spaces?
• Isn't there any short-circuit of air?
• Isn't there any fouling, clogging on indoor heat exchanger?

* For the contents of control, refer to the protective control by controlling compressor rotation speed and cooling high pressure protective control of micro computer control function for corresponding models.

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E37 | Indoor | Keeps flashing | Stays OFF | Outdoor heat exchanger temperature themistor anomaly |
| | Outdoor | Keeps flashing | 1 time flash | |

## 1. Applicable model

All models

## 2. Error detection method

Detection of anomalously low temperature (resistance) on the outdoor heat exchanger temperature thermistor

## 3. Condition of Error displayed

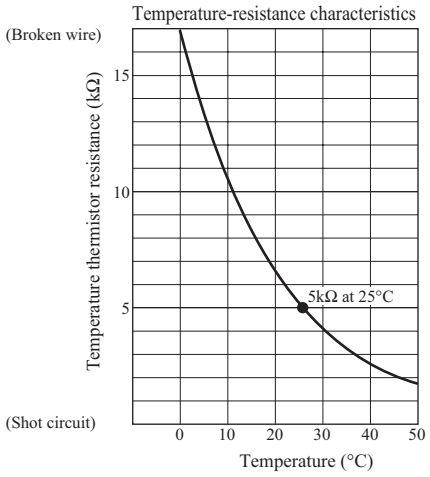
- When the temperature thermistor detects -50°C or lower for 20 seconds continuously within 2 minutes to 2 minutes 20 seconds after the compressor ON, the compressor stops. After 3-minutes delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes.
- When -50°C or lower is detected for 5 seconds continuously within 20 second after compressor ON.

## 4. Presumable cause

- Defective outdoor control PCB
- Broken thermistor harness or temperature sensing section
- Disconnected wire connection (connector)

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| Is the outdoor heat exchanger temperature thermistor connector connected properly? → NO | Correct connector. |
| YES → For the characteristics of outdoor heat exchanger temperature thermistor, see the following graph. Are the characteristics of outdoor heat exchanger temperature thermistor OK? → NO | Defective outdoor heat exchanger temperature thermistor→Replace. |
| YES | Defective outdoor control PCB→Replace. (Defective outdoor heat exchanger temperature thermistor input circuit) |




Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E38 | Indoor | Keeps flashing | Stays OFF | Outdoor air temperature thermistor anomaly |
| | Outdoor | Keeps flashing | 1 time flash | |

## 1. Applicable model

All models

## 2. Error detection method

Detection of anomalously low temperature (resistance) on outdoor air temperature thermistor

## 3. Condition of Error displayed

- When the temperature thermistor detects -45°C or lower for 5 seconds continuously within 2 minutes to 2 minutes 20 seconds after the compressor ON, the compressor stops. After 3-minutes delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes.
- When -45°C or lower is detected for 5 seconds continuously within 20 second after compressor ON.

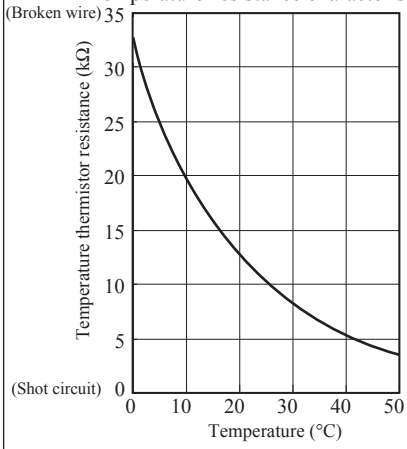
## 4. Presumable cause

- Defective outdoor control PCB
- Broken thermistor harness or temperature sensing section (Check molding.)
- Disconnected wire connection (connector)

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| Is the outdoor air temperature thermistor connector connected properly? → NO | Correct connector. |
| YES → For the characteristics of outdoor air temperature thermistor, see the following graph. Is the characteristics of the outdoor air temperature thermistor OK? → NO | Defective outdoor air temperature thermistor→ Replace. |
| YES | Defective outdoor control PCB→Replace. (Defective outdoor air temperature thermistor input circuit) |

Temperature-resistance characteristics




Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E39 | Indoor | Keeps flashing | Stays OFF | Discharge pipe temperature thermistor anomaly |
| | Outdoor | Keeps flashing | 1 time flash | |

## 1. Applicable model

All models

## 2. Error detection method

Detection of anomalously low temperature (resistance) on the discharge pipe temperature thermistor

## 3. Condition of Error displayed

When the temperature thermistor detects -10°C or lower for 5 seconds continuously within 10 minutes to 10 minutes 20 seconds after the compressor ON, the compressor stops. After 3-minutes delay, the compressor starts again automatically, but if this anomalous temperature is detected 3 times within 40 minutes.

## 4. Presumable cause

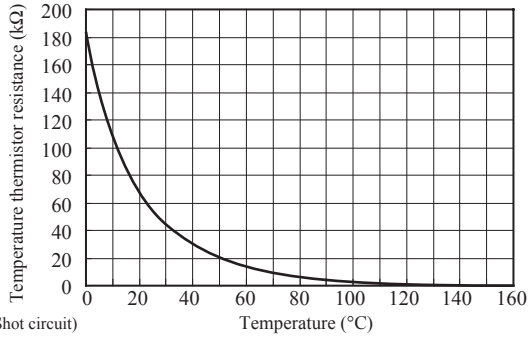
- Defective outdoor control PCB
- Broken thermistor harness or temperature sensing section (Check molding.)
- Disconnected wire connection (connector)

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| Is the discharge pipe temperature thermistor connector connected properly? → NO | Correct connector. |
| YES → Are the characteristics of discharge pipe temperature thermistor OK? (For the characteristics of discharge pipe temperature thermistor, see the following graph.) → NO | Defective discharge pipe temperature thermistor→ Replace. |
| YES | Defective outdoor control PCB→Replace. (Defective temperature thermistor input circuit) |

(Broken wire)

Temperature-resistance characteristics




(Shot circuit)

Note:

Error code

Remote controller: E40

| LED | Green | Red |
|---|---|---|
| Indoor | Keeps flashing | Stays OFF |
| Outdoor | Keeps flashing | 1 time flash |

Content

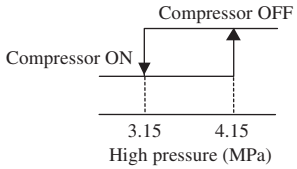
# High pressure error (63H1 activated)

## 1. Applicable model

All models

## 2. Error detection method

When the high pressure switch 63H1 is activated.




## 3. Condition of Error displayed

If 63H1 turns OFF (opened), the compressor stops. After 3-minutes delay, the compressor restarts. If this anomaly occurs 5 times within 60 minutes or continues for 60 minutes continuously.

## 4. Presumable cause

- Short circuit of air flow, disturbance of air flow and clogging filter at outdoor heat exchanger/Breakdown of fan motor
- Defective outdoor control PCB
- Defective 63H1 connector
- Defective electronic expansion valve connector
- Closed service valve
- Mixing of non-condensing gas (nitrogen, etc.)

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| If the power supply breaker is turned OFF and ON too quickly, E40 may be displayed. (This is normal.) | |
| Is the service valve fully opened? — NO | Open service valve. |
| YES | |
| Has 63H1 activated? — NO | |
| On operation of 63H1 — YES | |
| 1. During cooling<br>・ Is the outdoor fan motor running?<br>・ Isn't any short-circuit of air on the outdoor unit?<br>・ Are sufficient return air/supply air space secured?<br>2. During heating<br>・ Isn't the indoor heat exchanger temperature thermistor disconnected from the thermistor casing?<br>・ Isn't the filter clogged?<br>* Under the condition of overcharging refirgerant, 63H1 may activate due to delay of starting the preventive control by compressor speed control, because detected heat exhanger temperature, which conducts compressor speed control, becomes lower than normal condition due to excess sub-cooling degree. | |
| Is 63H1 connector connected properly? — NO | Correct 63H1 connector. |
| YES | |
| Is the electronic expansion valve connector connection OK? — NO | Correct electronic expansion valve connector. |
| If any anomaly exists on the electronic expansion valve connector connection, the power supply must be reset. | |
| YES | Defective outdoor control PCB→Replace. (Defective 63H1 input circuit) |

Note: In the protective control range for compressor startup (initial startup after power ON), even if 63H1 is activated only once (63H1turns OFF), immediately the error is displayed.

| Error code | LED | Green | Red |
|---|---|---|---|
| Remote controller: E41 | Indoor control PCB | Keeps flashing | Stays OFF |
| | Outdoor control PCB | Keeps flashing | 1 time flash |
| | Outdoor inverter PCB | Yellow LED | |
| | | 6 times flash or 2 times flash | |

Content

# Power transistor overheat
(Single phase model only)

## 1. Applicable model

Single phase model only

## 2. Error detection method

Anomalous rise of the internal power transistor temperature

## 3. Condition of Error displayed

When anomalous rise of the internal power transistor temperature is detected 5 times within 1 hour.

## 4. Presumable cause

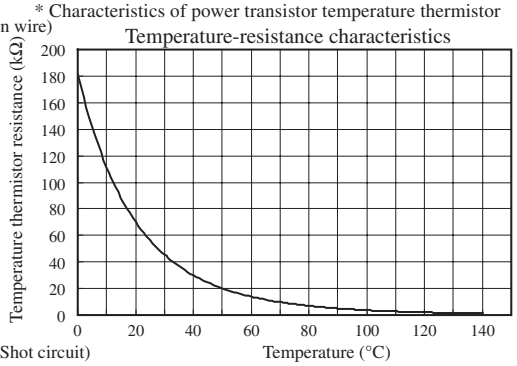
- Defective inverter PCB
- Defective outdoor fan motor
- Improperly fixed power transistor radiator fin
- Delective power transistor temperature thermistor
- Inadequate installation space

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| Is it possible to reset the error for about 10 minute after the compressor stopped? NO → Defective inverter PCB → Is it reset? YES → | OK |
| NO → | Replace power transistor. |
| YES → Is the installation space of outdoor unit enough? NO → Correct. | |
| YES → Is the outdoor fan running? NO → Replace the fan motor or outdoor control PCB. | |
| YES → Are the characteristics of power transistor temperature thermistor OK? NO → Replace the power transistor temperature thermistor. | |
| YES → Is the power transistor temperature thermistor connector connection OK? NO → Connect. | |
| YES → Is it OK the fixing to power transistor radiator fin? • Fixed screw • Application of radiation silicone NO → | Fix properly. |
| YES → Does it recur? YES → (loop) | |
| NO → | OK |

* Characteristics of power transistor temperature thermistor

(Broken wire)




(Shot circuit)

Note:

| Error code | LED | Green | Red |
|---|---|---|---|
| Remote controller: E42 | Indoor control PCB | Keeps flashing | Stays OFF |
| | Outdoor control PCB | Keeps flashing | 1 time flash |
| | Outdoor inverter PCB | Yellow LED | |
| | | Stays off or 4 times flash | |

Content

# Current cut (1/2)

## 1. Applicable model

All models

## 2. Error detection method

In order to prevent from overcurrent of inverter, if the current exceeds the specifications, it makes the compressor stopping.

## 3. Condition of Error displayed

- If the output current of inveter exceeds the specifications, it makes the compressor stopping.
- After 3-minute delay, the compressor restarts, but if this amonaly occurs 4 times within 30 minute after the intial detection.

## 4. Presumable cause

- The valves closed
- Faulty power supply
- Insufficient refrigerant amount
- Faulty compressor
- Faulty power transistor module

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| Is the Power supply voltage OK? — NO | Check power supply. |
| YES → Are the service valves opened? — NO | Open the valves. |
| YES → Is the high pressure during operation OK? — NO | Check refrigerant amount and refregerant circuit<br>*In case of transitional increase of high pressure and/or test run, several times restarting may recover it, because liquid refrigerant (migrated) in the compresser is discharged from the compressor. |
| YES → Is the checked result of insulation resistance and coil resistance (1) of compressor motor OK? — NO | Replace compressor. |
| (1) 1.154Ω or more at 20°C (Model FDC71VNX)<br>0.293Ω or more at 20°C (Models FDC100～140VNX)<br>1.172Ω or more at 20°C (Models FDC100～140VSX) | |
| YES | |

Continues to next page.

Note:

Error code

Remote controller: E42

| LED | Green | Red |
|---|---|---|
| Indoor | Keeps flashing | Stays OFF |
| Outdoor control PCB | Keeps flashing | 1 time flash |
| Outdoor inverter PCB | Yellow LED | |
| | 1 time flash or 5 times flash | |

Content

# Current cut (2/2)

## 1. Applicable model

All models

## 2. Error detection method

In order to prevent from overcurrent of inverter, if the current exceeds the specifications, it makes the compressor stopping.

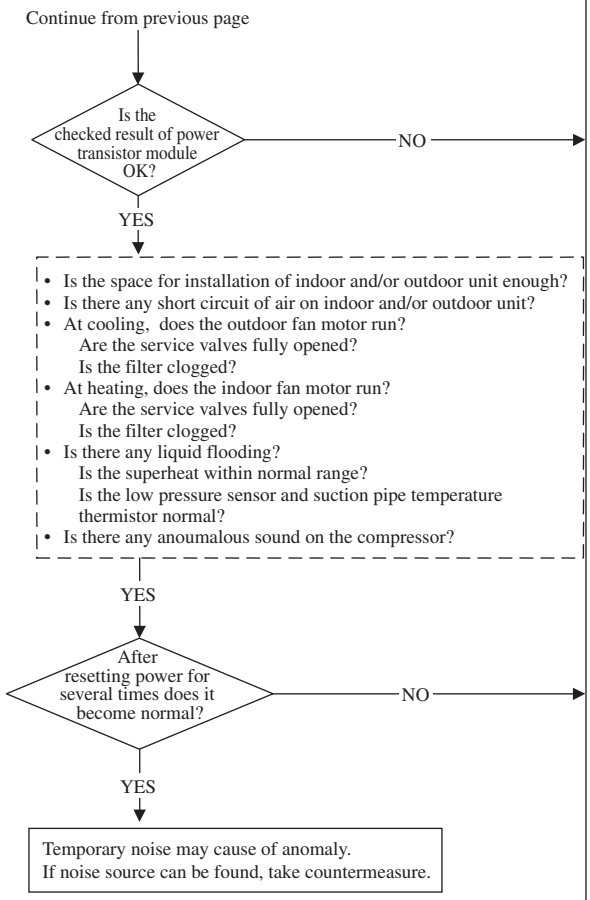
## 3. Condition of Error displayed

- If the output current of inveter exceeds the specifications, it makes the compressor stopping.
- After 3-minute delay, the compressor restarts, but if this amonaly occurs 4 times within 30 minute after the intial detection.

## 4. Presumable cause

- Defective outdoor control PCB
- Defective inverter PCB
- Faulty power supply
- Insufficient refrigerant amount
- Faulty compressor
- Faulty power transistor module

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
|  | Defective inverter PCB→ Replace.<br><br>Defective inverter PCB→ Replace. |

Continue from previous page
Is the checked result of power transistor module OK?
NO
YES
• Is the space for installation of indoor and/or outdoor unit enough?
• Is there any short circuit of air on indoor and/or outdoor unit?
• At cooling, does the outdoor fan motor run?
Are the service valves fully opened?
Is the filter clogged?
• At heating, does the indoor fan motor run?
Are the service valves fully opened?
Is the filter clogged?
• Is there any liquid flooding?
Is the superheat within normal range?
Is the low pressure sensor and suction pipe temperature thermistor normal?
• Is there any anoumalous sound on the compressor?
YES
After resetting power for several times does it become normal?
NO
YES
Temporary noise may cause of anomaly.
If noise source can be found, take countermeasure.

Note:

Error code

Remote controller: E45

| LED | Green | Red |
|---|---|---|
| Indoor | Keeps flashing | Stays OFF |
| Outdoor | Keeps flashing | 1 time flash |

Content

# Inverter communication error

## 1. Applicable model

All models

## 2. Error detection method

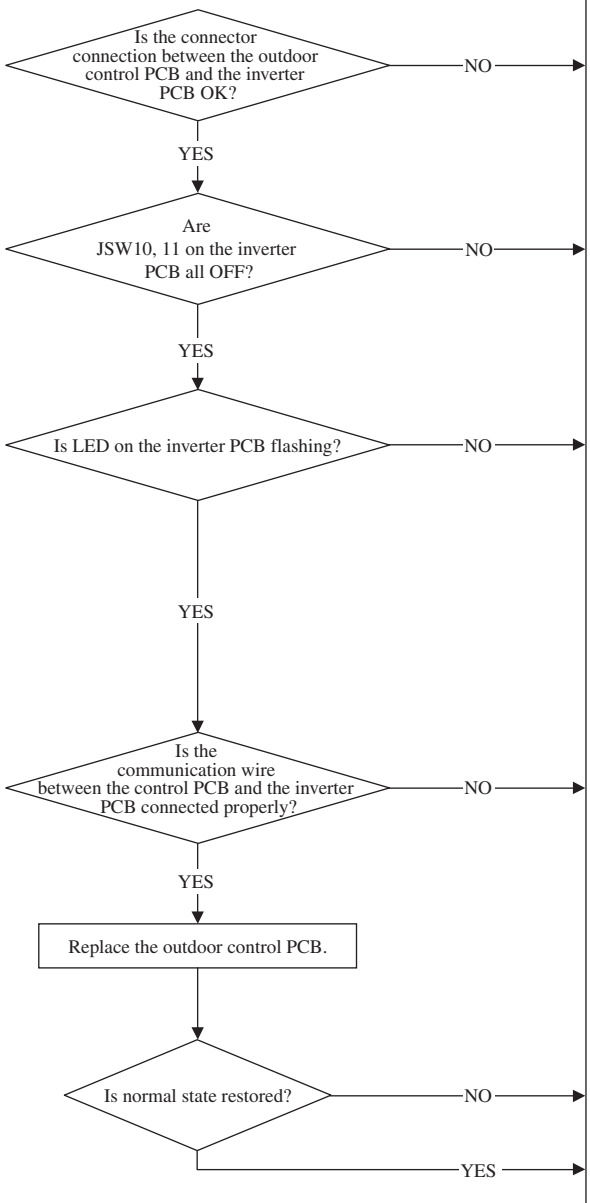
## 3. Condition of Error displayed

When communication is not established between the inverter PCB and the outdoor control PCB.

## 4. Presumable cause

- Defective inverter PCB
- Defective connector between the outdoor control PCB and inverter PCB
- Defective outdoor control PCB

## 5. Troubleshooting




Note:

| Error code | LED | Green | Red |
|---|---|---|---|
| Remote controller: E47 | Indoor | Keeps flashing | Stays off |
| | Outdoor control PCB | Keeps flashing | 1 time flash |
| | Outdoor Inverter PCB | Yellow LED | |
| | | 7 times flashing | |

Content

# Inverter PCB A/F module anomaly
(Model FDC71VNX)

## 1. Applicable model

Model FDC71

## 2. Error detection method

In order to prevent from overcurrent of A/F, if the current exceeds the specifications, it makes the compressor stopping.

## 3. Condition of error displayed

- If the output current of A/F exceeds the specifications, it makes the compressor stopping.

## 4. Presumable cause

- Defective inverter PCB

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| Is the Power supply voltage OK? — NO | Check power supply. |
| YES → Is the checked results of insulation resistance and coil resistance (1) of compressor motor OK? — NO | Replace compressor. |
| (1) 1.154Ω or more at 20°C (FDC71) | |
| YES | Defective outdoor Inverter PCB→Replace. |

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E48 | Indoor | Keeps flashing | Stays OFF | Outdoor fan motor anomaly |
| | Outdoor | Keeps flashing | 1 time flash | |

## 1. Applicable model

All models

## 2. Error detection method

Detected by rotation speed of outdoor fan motor

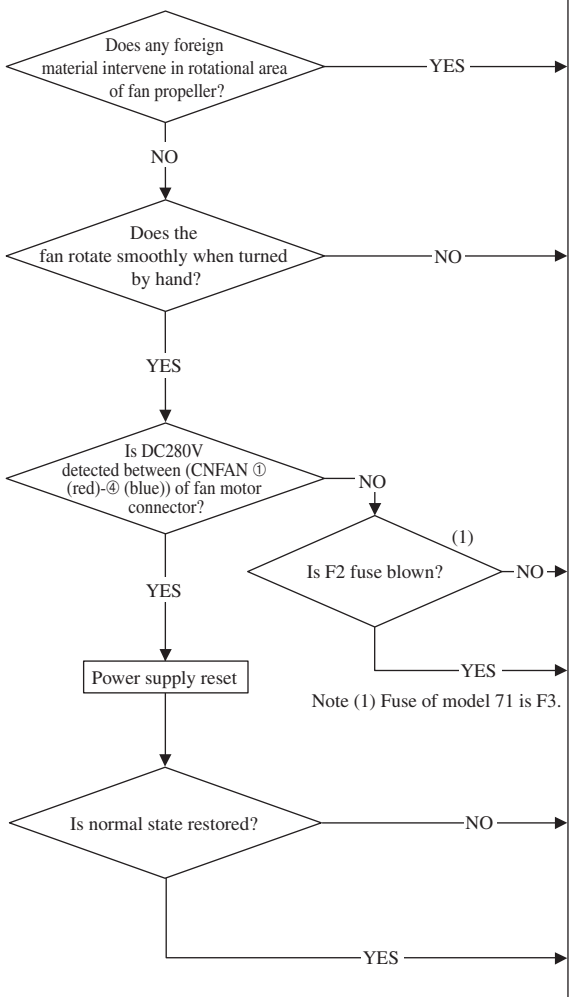
## 3. Condition of Error displayed

When actual rotation speed of outdoor fan motor (FMo1) drops to 100min$^{-1}$ or lower for 30 minutes continuously, the compressor and the outdoor fan motor stop. After 3-minutes delay, it starts again automatically, but if this anomaly occurs 5 times within 60 minutes after the initial detection.

## 4. Presumable cause

- Defective outdoor control PCB
- Foreign material at rotational area of fan propeller
- Defective fan motor
- Dust on outdoor control PCB
- Blow fuse
- External noise, surge

## 5. Troubleshooting


Diagnosis
Countermeasure
Does any foreign material intervene in rotational area of fan propeller?
YES
Remove foreign material.
NO
Does the fan rotate smoothly when turned by hand?
NO
Replace fan motor. If resistance between ① (Vm):red -④(GND):blue is detected 1kΩ or lower, it is faulty.
YES
Is DC280V detected between (CNFAN ① (red)-④ (blue)) of fan motor connector?
NO
(1)
Is F2 fuse blown?
NO
Check power supply voltage.
YES
YES
Power supply reset
Replace faulty fan motor and control PCB.
Note (1) Fuse of model 71 is F3.
Is normal state restored?
NO
Replace fan motor (If anomaly persists after replacing fan motor, replace control PCB.)
YES
Malfunction by temporary noise

Note: When E48 error occurs, in almost cases F2 fuse (4A) [Model 71:F3 fuse (2A)]on the outdoor control PCB is blown. There are a lot of cases that fuse is blown and E48 occurs due to defective fan motor. And even though only the outdoor control PCB ( or fuse) is replaced,, another trouble (*1) could occur. Therefore when fuse is blown, check whether the fan motor is OK or not.
After confirming the fan motor normal, check by power ON. (Don't power ON without confirming the fan motor normal.)
*1 The error which does not seem to relate E48 may occur like as "WAIT", Stay OFF of LED on outdoor control PCB, inverter communication error (E45) and etc.

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E49 | Indoor | Keeps flashing | Stays OFF | Low pressure error or low pressure sensor anomaly (1/2) |
| | Outdoor | Keeps flashing | 1 time flash | |

## 1. Applicable model

All models

## 2. Error detection method

Detected by low pressure drop and suction superheat

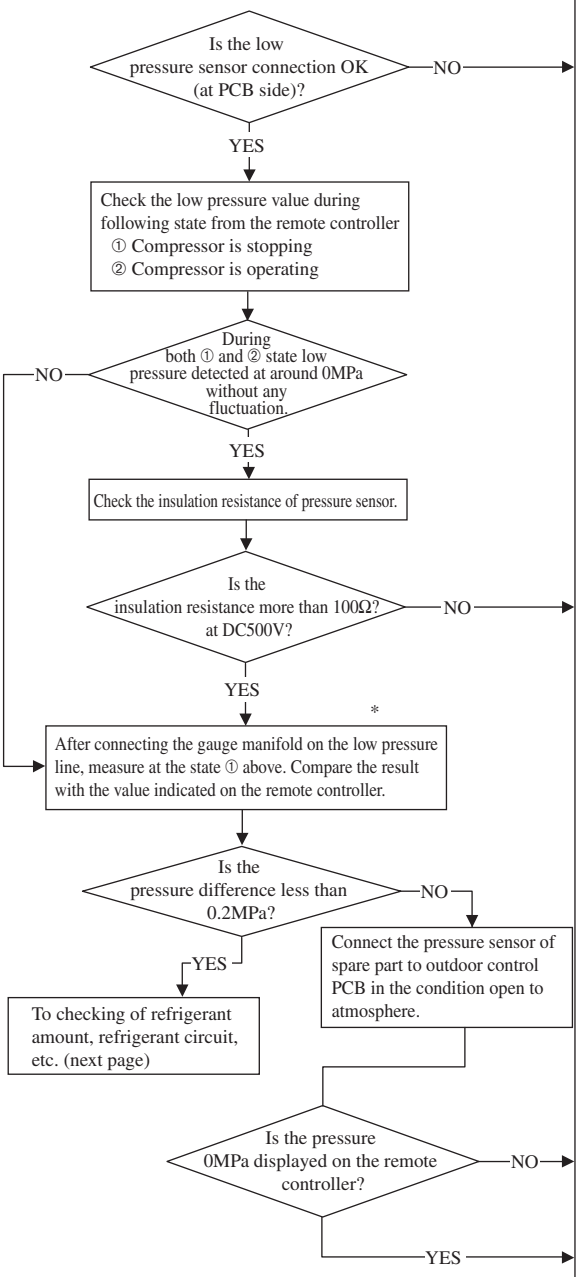
## 3. Condition of Error displayed

① When the low pressure sensor detects 0.079MPa or lower for 15 seconds continuously, compressor stops and it restarts automatically after 3-minutes delay. And if this anomaly occurs 3 times within 60 minutes,
② 10 minutes after the compressor starts, if the low pressure sensor detects 0.15MPa or lower for 60 minutes continuously and compressor suction superheat is detected 30degC or higher for 60 minutes continuously. And if this anomaly occurs 3 times within 60 minutes,
③ If low pressure sensor detects 0.079MPa or lower for 5 minutes continuously (including the compressor stop status),

## 4. Presumable cause

- Defective outdoor control PCB
- Defective low pressure sensor connector
- Defective low pressure sensor
- Defective suction pipe temperature thermistor connector
- Defective suction pipe temperature thermistor

## 5. Troubleshooting


Diagnosis
Countermeasure
Is the low pressure sensor connection OK (at PCB side)?
NO
Correct.
YES
Check the low pressure value during following state from the remote controller
① Compressor is stopping
② Compressor is operating
During both ① and ② state low pressure detected at around 0MPa without any fluctuation.
NO
YES
Check the insulation resistance of pressure sensor.
Is the insulation resistance more than 100Ω? at DC500V?
NO
Replace low pressure sensor.
YES
*
After connecting the gauge manifold on the low pressure line, measure at the state ① above. Compare the result with the value indicated on the remote controller.
Is the pressure difference less than 0.2MPa?
NO
YES
Connect the pressure sensor of spare part to outdoor control PCB in the condition open to atmosphere.
To checking of refrigerant amount, refrigerant circuit, etc. (next page)
Is the pressure 0MPa displayed on the remote controller?
NO
Defective outdoor control PCB→Replace.
YES
Replace low pressure sensor.

Note: * Connect the gauge manifold to the service valve check joint during cooling, or connect it to the check joint at internal piping of outdoor unit during heating.

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E49 | Indoor | Keeps flashing | Stays OFF | Low pressure error or low pressure sensor anomaly (2/2) |
| | Outdoor | Keeps flashing | 1 time flash | |

## 1. Applicable model

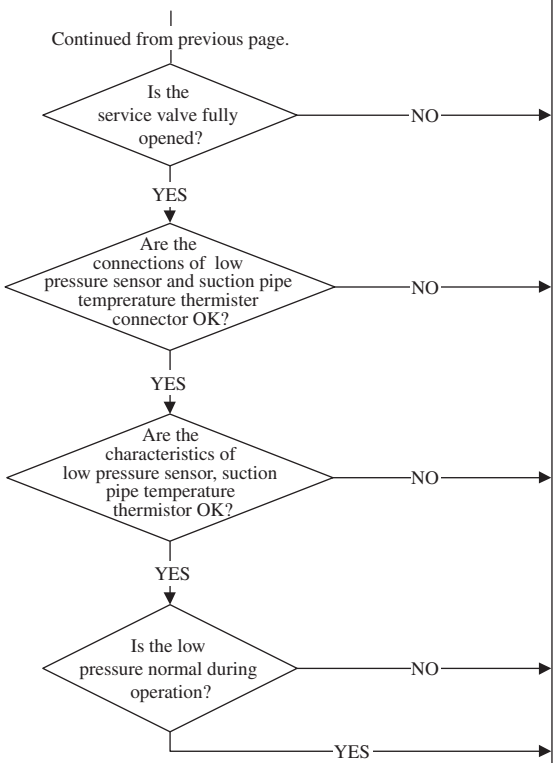
All models

## 2. Error detection method

## 3. Condition of Error displayed

## 4. Presumable cause

## 5. Troubleshooting


Diagnosis
Countermeasure
Continued from previous page.
Is the service valve fully opened?
NO
Open fully.
YES
Are the connections of low pressure sensor and suction pipe tempreratue thermister connector OK?
NO
Correct.
YES
Are the characteristics of low pressure sensor, suction pipe temperature thermistor OK?
NO
Defective low pressure sensor, suction pipe temperature thermistor→ Replace.
YES
Is the low pressure normal during operation?
NO
Charge refrigerant.
YES
Defective outdoor control PCB→Replace. (Defective low pressure sensor, suction pipe temperature thermistor circuits)

Note:

| Error code | LED | Green | Red |
|---|---|---|---|
| Remote controller: E51 | Indoor control PCB | Keeps flashing | Stays OFF |
| | Outdoor control PCB | Keeps flashing | 1 time flash |
| | Outdoor inverter PCB | Yellow LED | |
| | | 2 times flash or 6 times flash | |

Content

# Inverter and fan motor anomaly

## 1. Applicable model

All models

## 2. Error detection method

When power transistor anomaly is detected for 15 minutes continuously

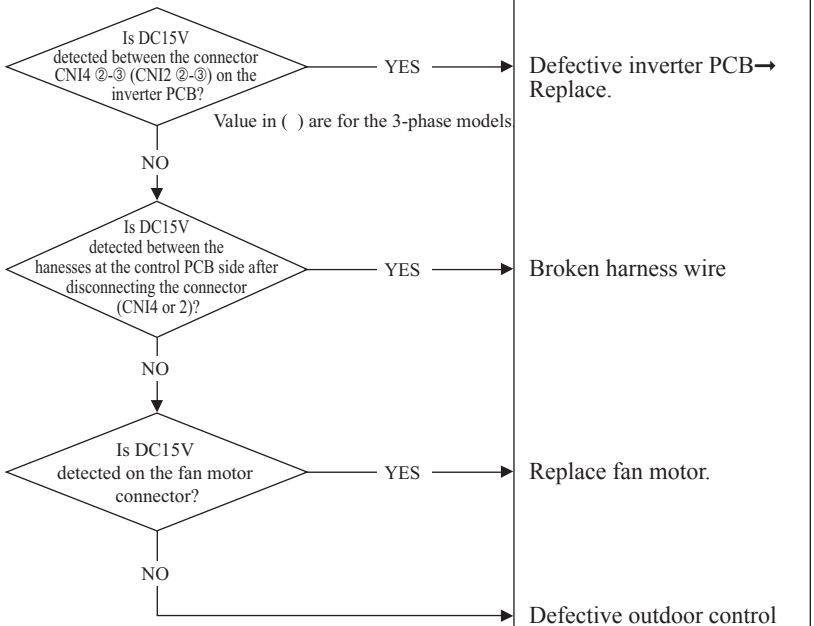
## 3. Condition of Error displayed

Same as above

## 4. Presumable cause

- Defective outdoor fan motor
- Defective inverter PCB
- Defective outdoor control PCB

## 5. Troubleshooting


Diagnosis
Countermeasure
Is DC15V detected between the connector CNI4 ②-③ (CNI2 ②-③) on the inverter PCB?
YES
Defective inverter PCB→ Replace.
Value in ( ) are for the 3-phase models
NO
Is DC15V detected between the hanesses at the control PCB side after disconnecting the connector (CNI4 or 2)?
YES
Broken harness wire
NO
Is DC15V detected on the fan motor connector?
YES
Replace fan motor.
NO
Defective outdoor control PCB→Replace.

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E53 | Indoor | Keeps flashing | Stays OFF | Suction pipe temperature thermistor anomaly |
| | Outdoor | Keeps flashing | 1 time flash | |

## 1. Applicable model

All models

## 2. Error detection method

When the suction pipe temperature thermistor detects anomalously low temperature

## 3. Condition of Error displayed

If the temperature thermistor detects -50°C or lower for 5 seconds continuously within 10 minutes to 10 minutes 20 seconds after compressor ON, the compressor stops. When the compressor is restarted automatically after 3-minutes delay, if this anomaly ocuurs 3 times within 40 minute.

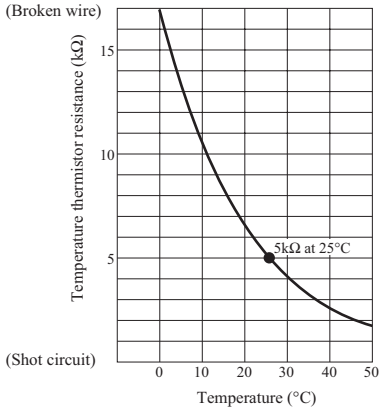
## 4. Presumable cause

- Defective suction pipe temperature thermistor connection
- Defective suction pipe temperature thermistor
- Defective outdoor control PCB

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| Is the connection of suction pipe temperature thermistor connector OK? — NO | Correct connection of suction pipe temperature thermistor connector. |
| YES → Are the characteristics of suction pipe temperature thermistor OK? — NO | Defective suction pipe temperature thermistor→ Replace. |
| YES | Defective outdoor control PCB→Replace. (Defective suction pipe temperature thermistor input circuit) |

Temperature-resistance characteristics




Note:

Error code

Remote controller: E54

| LED | Green | Red |
|---|---|---|
| Indoor | Keeps flashing | Stays OFF |
| Outdoor | Keeps flashing | 1 time flash |

Content

# Low pressure sensor anomaly

## 1. Applicable model

All models

## 2. Error detection method

When anomalous voltage (pressure) is detected

## 3. Condition of Error displayed

If the pressure sensor detects 0V or lower and 3.49V or higher for 5 seconds continuously within 2 minutes to 2 minutes 20 seconds after compressor ON, the compressor stops. When the compressor is restarted automatically after 3-minuts delay, if this anomaly occurs 3 times within 40 minutes

## 4. Presumable cause

- Defective low pressure sensor connection
- Defective low pressure sensor
- Defective outdoor control PCB
- Improper amount of refrigerant
- Anomalous refrigeration circuit

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| Are the connection of low pressure sensor connectors (at sensor side and PCB side) OK? — NO | Correct low pressure sensor connector connection. |
| YES → Are the pressure (actual measurement) matched with the value indicated on the remote controller? — YES | Is refrigerant amount charged properly? Is there any anomaly on the refrigeration circuit? |
| NO → Replace the low pressure sensor. → Is normal condition restored? — NO | Defective outdoor control PCB→Replace. (Defective low pressure sensor input circuit) |
| YES | OK |

Note:

| Error code | LED | Green | Red | Content |
|---|---|---|---|---|
| Remote controller: E57 | Indoor | Keeps flashing | Stays OFF | Insufficient refrigerant amount or detection of service valve closure |
| | Outdoor | Keeps flashing | 1 time flash | |

## 1. Applicable model

All models

## 2. Error detection method

- Judge insufficient refrigerant amount by detecting the temperature differnce between indoor heat exchanger (ThI-R) and indoor return air (ThI-A).
- It detects at initial startup in cooling or dehumidifying mode after power ON. (In case of model 71 it cannot detect)

## 3. Condition of Error displayed

When the insufficient refrigerant amount is detected 3 times within 30 minutes.
(In case of Models 100 ～ 140 it makes anomalous stop at initial detection)

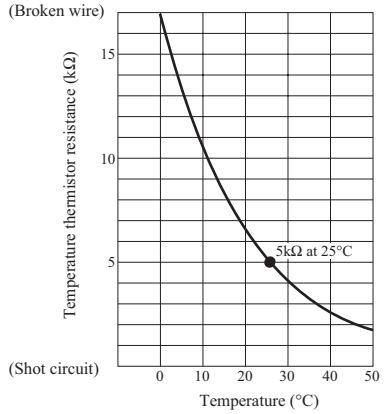
## 4. Presumable cause

- Defective indoor heat exchanger temperature thermistor
- Defective indoor return air temperature thermistor
- Defective indoor control PCB
- Insufficient refregerant amount

## 5. Troubleshooting

| Diagnosis | Countermeasure |
|---|---|
| Is the service valve fully opened? NO | Open fully. |
| YES → Are the connections of indoor heat exchanger and/or return air temperature thermistor connectors OK? NO | Correct indoor heat exchanger, return air temperature thermistor connector connections. |
| YES → Are the characteristics of indoor heat exchanger and/or return air temperature thermistor OK? NO | Defective indoor heat exchanger, return air temperature thermistor → Replace. |
| YES → Is the low pressure during operation normal? NO | Charge refrigerant. |
| YES | Defective indoor control PCB→Replace. (Defective indoor heat exchanger, return air temperature thermistor input circuits) |

Indoor heat exchanger, return air temperature thermistor
Temperature-resistance characteristics




Note: Insufficient refrigerant amount preventive control makes compressor stopped, if it judges insufficient refrigerant amount by detecting the temperature difference between indoor heat exchanger (ThI-R) and return air temperature (ThI-A) for 1 minute after compressor ON in cooling or dehumidifying mode and for 9 minutes after compressor ON in heating mode. [ in cooling mode: (ThI-A)-(ThI-R)>4degC, in heating mode: (ThI-R)-(ThI-A)<4degC]

| Error code | LED | Green | Red |
|---|---|---|---|
| Remote controller: E59 | Indoor control PCB | Keeps flashing | Stays OFF |
| | Outdoor control PCB | Keeps flashing | 1 time flash |
| | Outdoor inverter PCB | Yellow LED | |
| | | Stays off or 4 times flash | |

Content

# Compressor startup failure

## 1. Applicable model

All models

## 2. Error detection method

If it fails to change over to the rotor detection operation of compressor motor (If the compressor speed cannot increase 11Hz or higher)

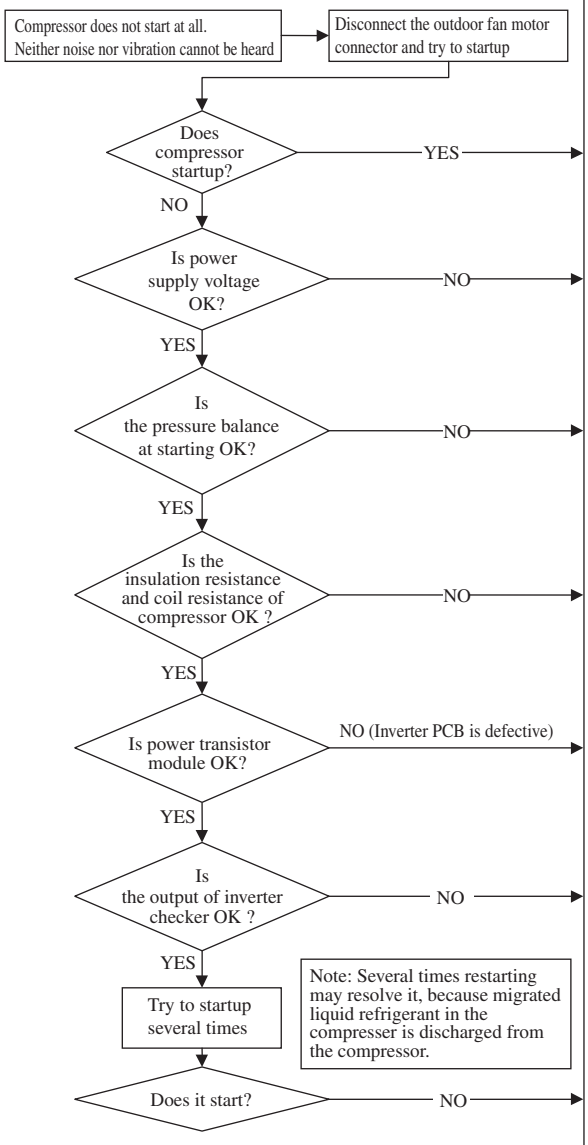
## 3. Condition of Error displayed

If compressor fails to startup for 20 times (10 patterns x 2 times). (It is availabel to reset by remote controller after 3 minutes delay)

## 4. Presumable cause

- Faulty outdoor fan motor
- Faulty inverter PCB
- Anomalous power supply voltage
- Improper refrigerant amount and refrigerant circuit
- Faulty compressor (Motor bearing)

## 5. Troubleshooting


Diagnosis
Countermeasure
Compressor does not start at all. Neither noise nor vibration cannot be heard
Disconnect the outdoor fan motor connector and try to startup
Does compressor startup?
YES
Replace outdoor fan motor
NO
Is power supply voltage OK?
NO
Check power supply voltage
YES
Is the pressure balance at starting OK?
NO
Check refrigerant amount and refrigerant circuit
YES
Is the insulation resistance and coil resistance of compressor OK ?
NO
Repalce compressor
YES
Is power transistor module OK?
NO (Inverter PCB is defective)
Defective inverter PCB→ Replace.
YES
Is the output of inverter checker OK ?
NO
Defective inverter PCB→ Replace.
YES
Try to startup several times
Note: Several times restarting may resolve it, because migrated liquid refrigerant in the compresser is discharged from the compressor.
Does it start?
NO
Repalce compressor

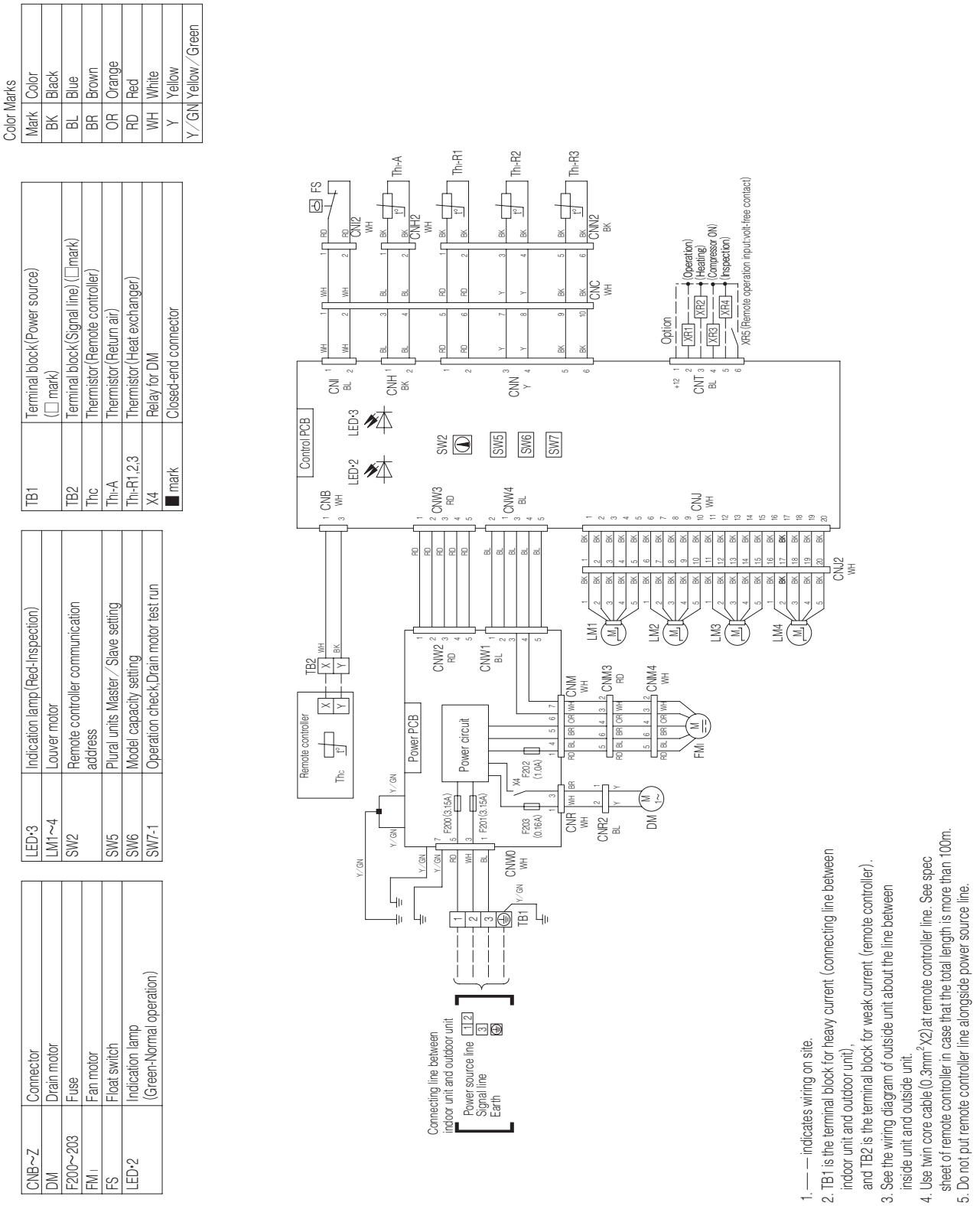
Note: Insulation resistance
- The unit is left for long period without power supply or soon after installation, migrated liquid refrigerant may dissolve in the refrigerant oil in the compressor. In such case insulation resistance decreases upto several MΩ or lower. If the electric leakage breaker is activated due to low insulation resistance, check followings.
  ① Check whehter the insulation resistance can recover or not, ater 6 hours has passed since power ON. (By energize the crankcase heater, migrated liquid refrigerant in the refrigerant oil in compressor can be evaporated)
  ② Check whether the electric leakage breake conforms to high-hermonic specifications (As units has inverter, in order to prevent from improper operation, be sure to use high-hermonic one.)

# 3. ELECTRICAL WIRING

## (1) Indoor units

### (a) Ceiling cassette-4 way compact type (FDTC)

### Models FDTC40VD, 50VD, 60VD

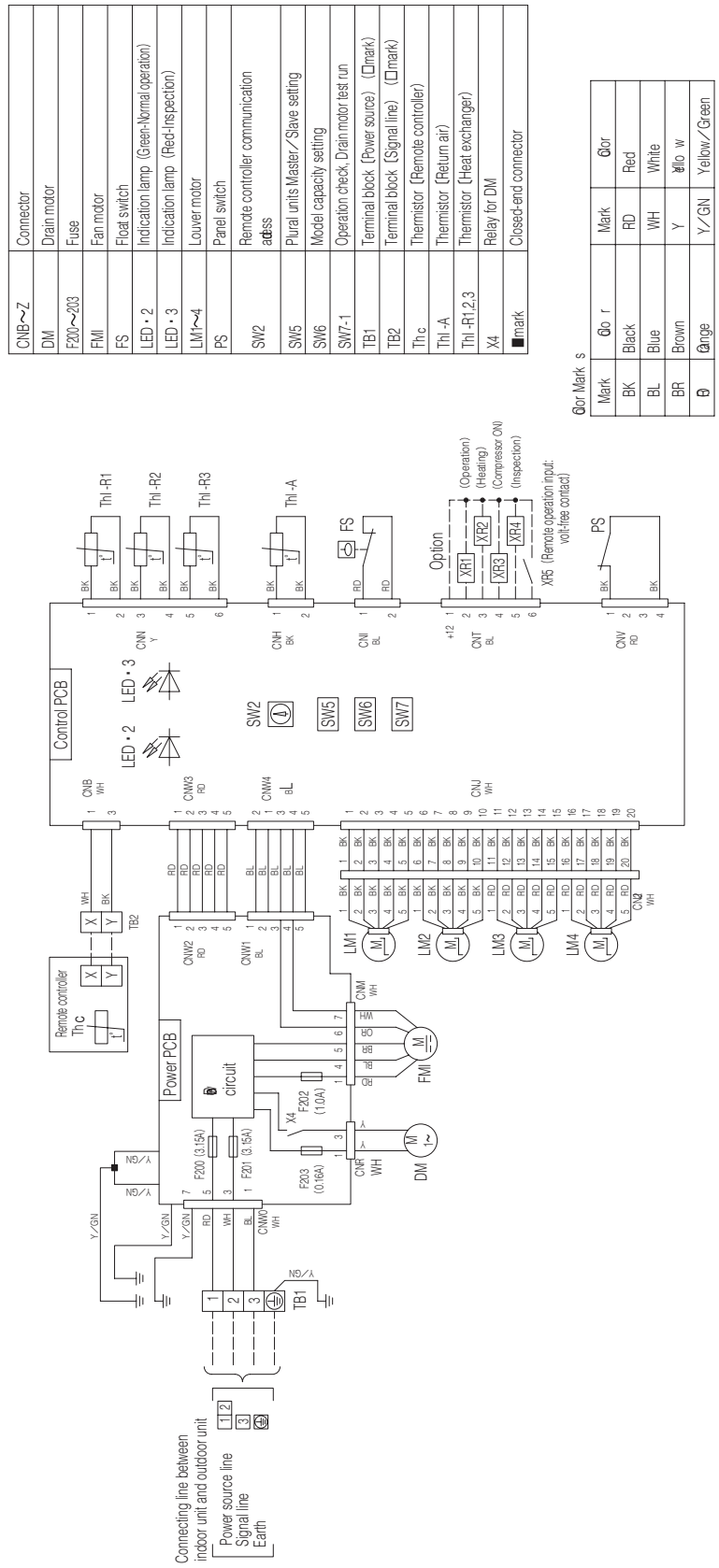



Notes 1. — — indicates wiring on site.
2. TB1 is the terminal block for heavy current (connecting line between indoor unit and outdoor unit), and TB2 is the terminal block for weak current (remote controller).
3. See the wiring diagram of outside unit about the line between inside unit and outside unit.
4. Use twin core cable (0.3mm$^2$X2) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
5. Do not put remote controller line alongside power source line.

PJA003Z340 B

**(b) Ceiling cassette-4 way type (FDT)**

**Models FDT40VD, 50VD, 60VD, 71VD, 100VD, 125VD, 140VD**

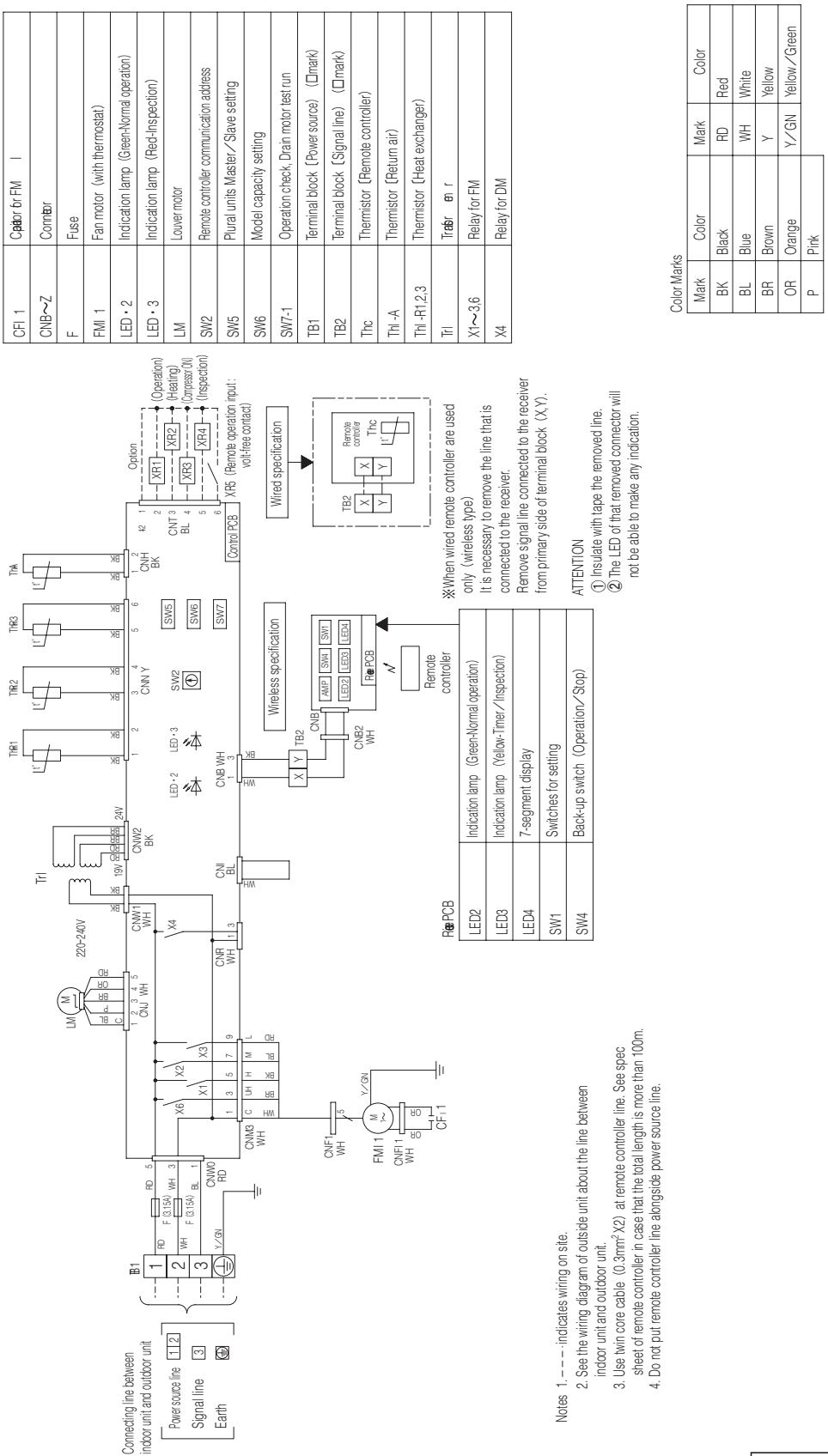



Notes 1. – – – indicates wiring on site.
2. See the wiring diagram of outside unit about the line between inside unit and outside unit.
3. Use twin core cable (0.3mm²X2) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put remote controller line alongside power source line.

PJF000Z190

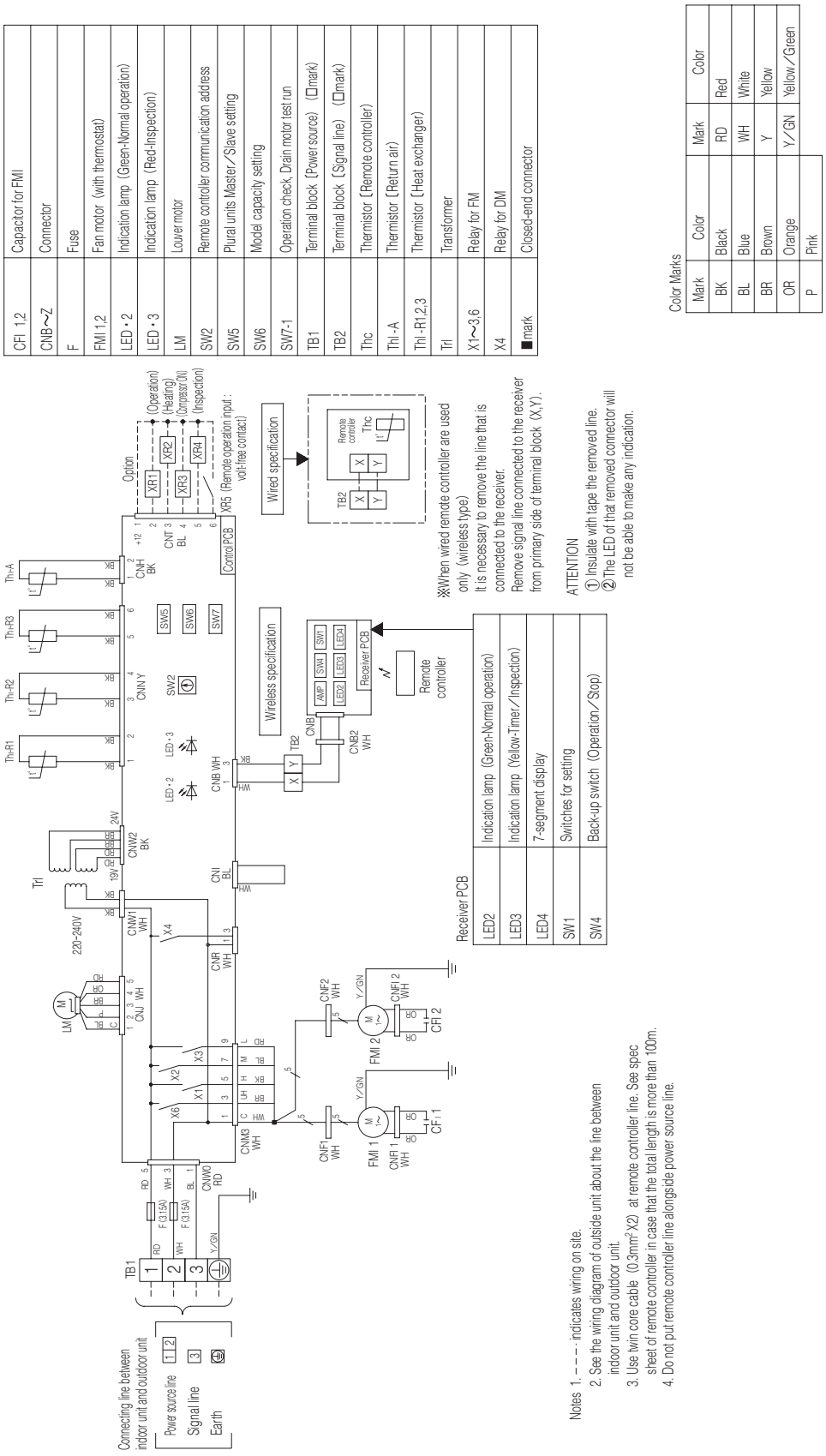
## (c) Ceiling suspended type (FDEN)

### Models FDEN40VD, 50VD




PFA003Z819 A

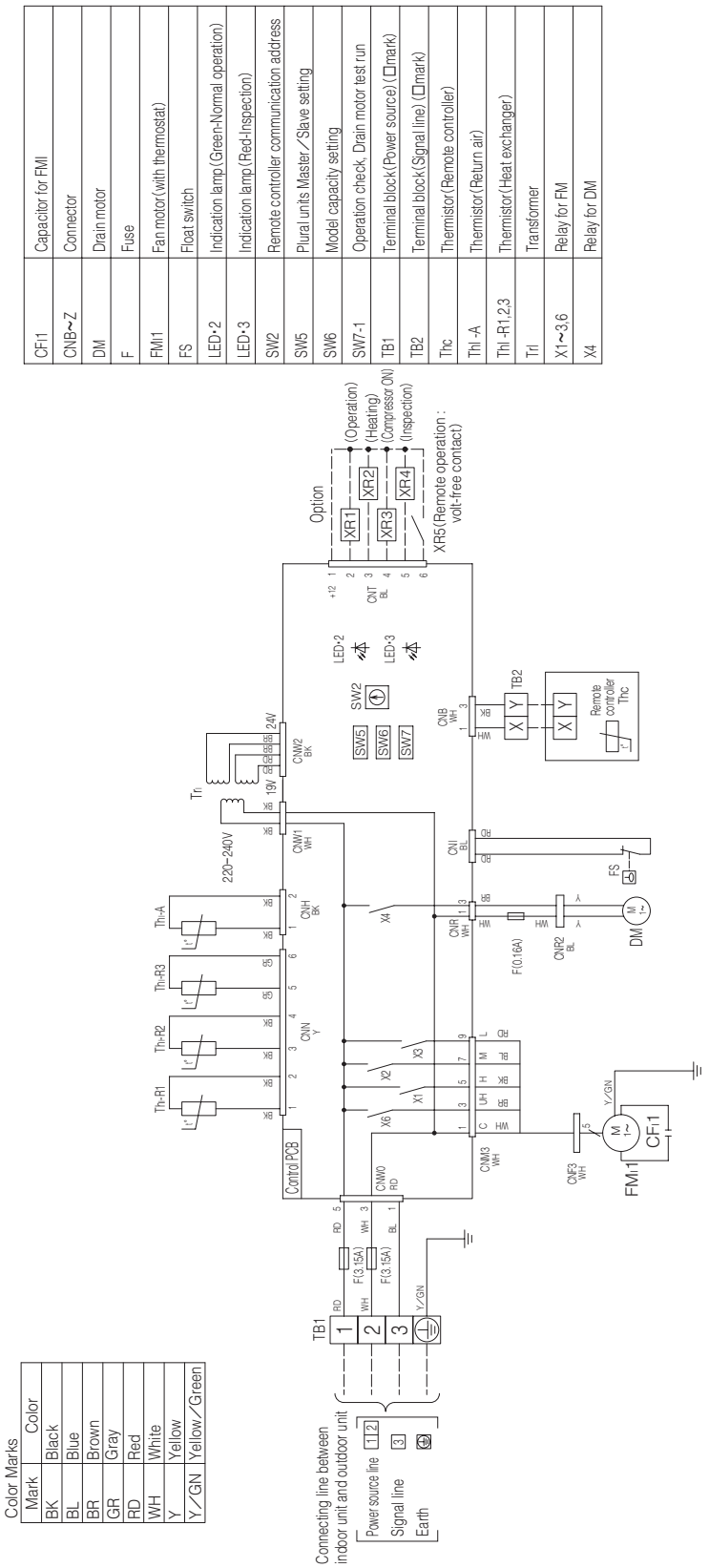
**Models FDEN60VD, 71VD, 100VD, 125VD, 140VD**




PFA003Z820 B

**(d) Duct connected-Low/Middle static pressure type (FDUM)**

**Models FDUM50VD, 60VD, 71VD**

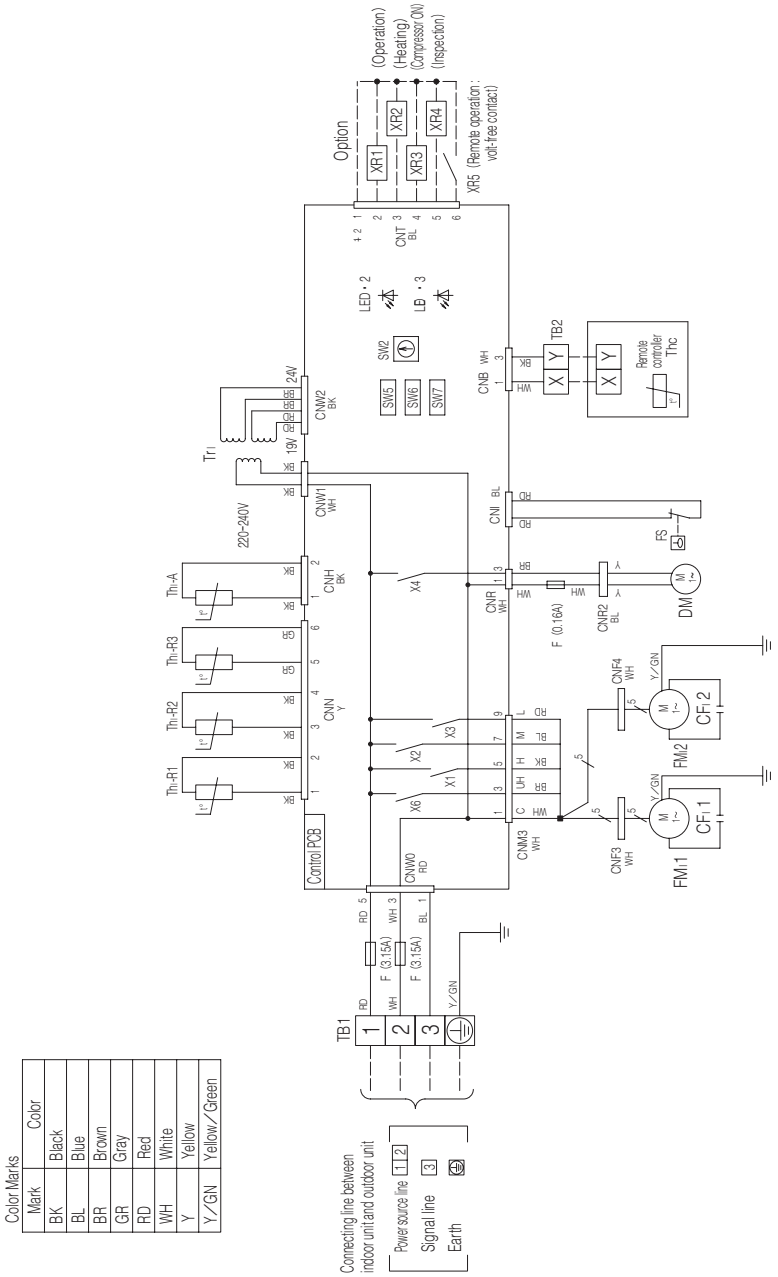



Notes 1. —— indicates wiring on site.
2. See the wiring diagram of outside unit about the line between inside unit and outside unit.
3. Use twin core cable (0.3mm$^2$ X2) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put remote controller line alongside power source line.

PJR002Z244 B

**Models FDUM100VD, 125VD, 140VD**

| | |
|---|---|
| CFi1,2 | Cabl FM I |
| CNB~Z | Co n |
| DM | Drain motor |
| F | Fuse |
| FMi1, 2 | Fan motor (with thermostat) |
| FS | Float switch |
| LED・2 | Indication lamp (Green-Normal operation) |
| LED・3 | Indication lamp (Red-Inspection) |
| SW2 | Remote controller communication address |
| SW5 | Plural units Master/Slave setting |
| SW6 | Model capacity setting |
| SW7-1 | Operation check, Drain motor test run |
| TB1 | Terminal block (Power source) (□mark) |
| TB2 | Terminal block (Signal line) (□mark) |
| Thc | Thermistor (Remote controller) |
| Thi -A | Thermistor (Return air) |
| Thi -R1,2,3 | Thermistor (Heat exchanger) |
| Tri | Tra r |
| X1~3,6 | Relay for FM |
| X4 | Relay for DM |
| ■mark | Closed-end connector |



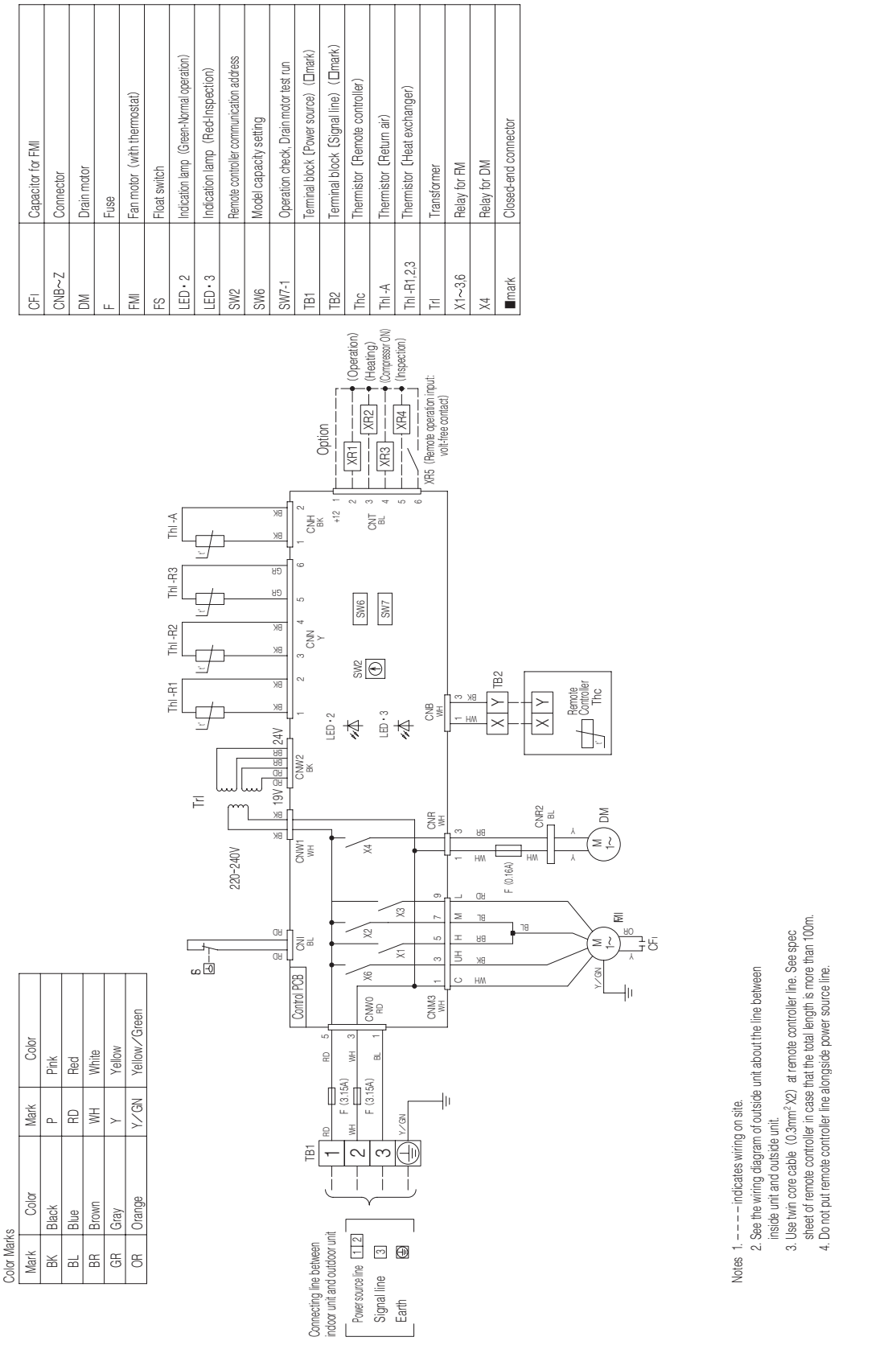

| Color Marks | |
|---|---|
| Mark | Color |
| BK | Black |
| BL | Blue |
| BR | Brown |
| GR | Gray |
| RD | Red |
| WH | White |
| Y | Yellow |
| Y/GN | Yellow/Green |

Notes 1. – – – : indicates wiring on site.
2. See the wiring diagram of outside unit about the line between inside unit and outside unit.
3. Use twin core cable (0.3mm² X2) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put remote controller line alongside power source line.

PJR002Z245 B

**(e) Duct connected-High static pressure type (FDU)**

**Model FDU71VD**

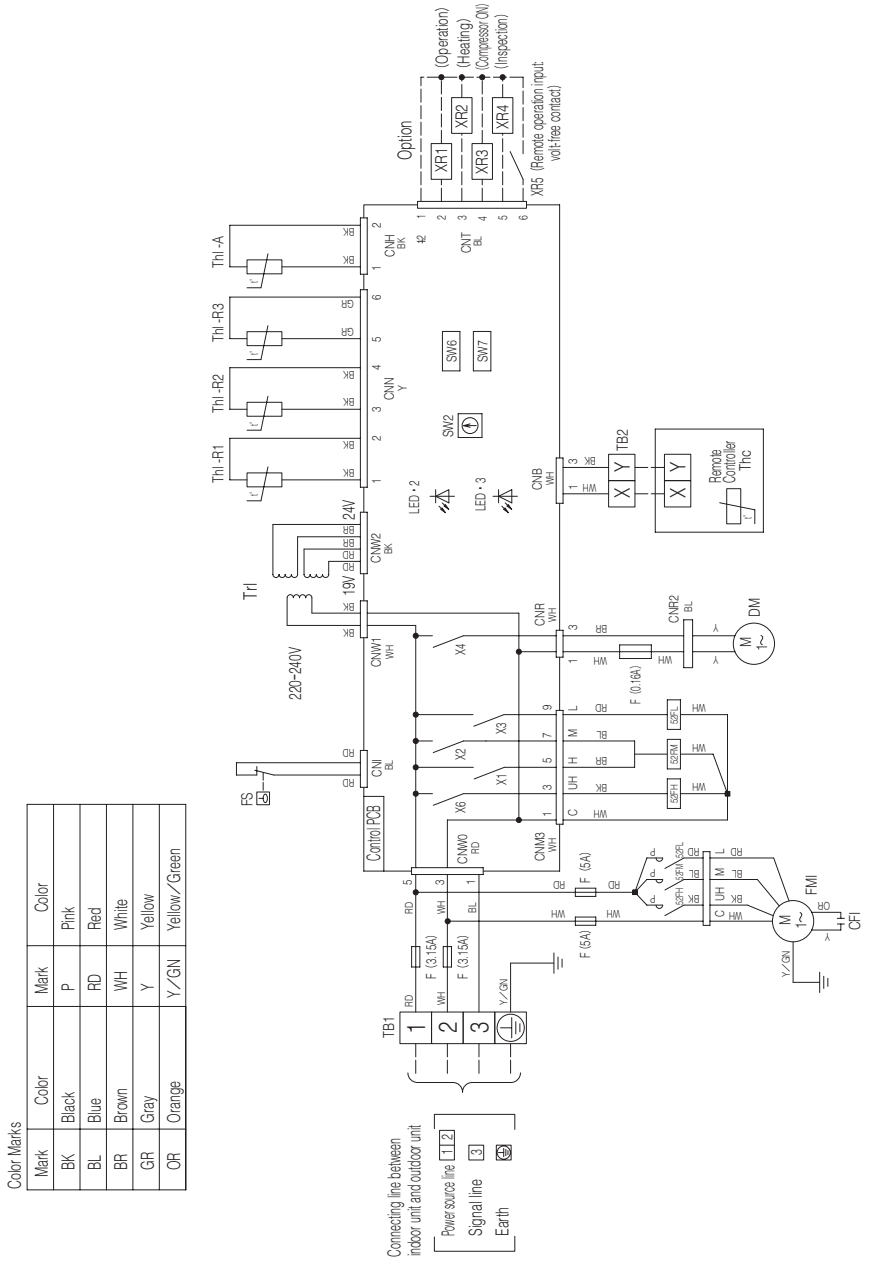



Notes 1. – – – indicates wiring on site.
2. See the wiring diagram of outside unit about the line between inside unit and outside unit.
3. Use twin core cable (0.3mm$^2$ X2) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put remote controller line alongside power source line.

PJD001Z304

**Models FDU100VD, 125VD, 140VD**

| | |
|---|---|
| CFI | Capacitor for FMI |
| CNB~Z | Connector |
| DM | Drain motor |
| F | Fuse |
| FMI | Fan motor (with thermostat) |
| FS | Float switch |
| LED・2 | Indication lamp (Green-Normal operation) |
| LED・3 | Indication lamp (Red-Inspection) |
| SW2 | Remote controller communication address |
| SW6 | Model capacity setting |
| SW7-1 | Operation check, Drain motor test run |
| TB1 | Terminal block (Power source) (□mark) |
| TB2 | Terminal block (Signal line) (□mark) |
| Thc | Thermistor (Remote controller) |
| Thl-A | Thermistor (Return air) |
| Thl-R1,2,3 | Thermistor (Heat exchanger) |
| Trl | Transformer |
| X1~3,6 | Relay for FM |
| X4 | Relay for DM |
| ■mark | Closed-end connector |
| S2FL,FM,FH | Electromagnetic contactor for FMI |




Color Marks

| Mark | Color |
|---|---|
| BK | Black |
| BL | Blue |
| BR | Brown |
| GR | Gray |
| OR | Orange |

| Mark | Color |
|---|---|
| P | Pink |
| RD | Red |
| WH | White |
| Y | Yellow |
| Y/GN | Yellow/Green |

Note 1. – – – : indicates wiring on site.
2. See the wiring diagram of outside unit about the line between inside unit and outside unit.
3. Use twin core cable (0.3mm²X2) at remote controller line. See spec sheet of remote controller in case that the total length is more than 100m.
4. Do not put remote controller line alongside power source line.

PJD001Z217 B

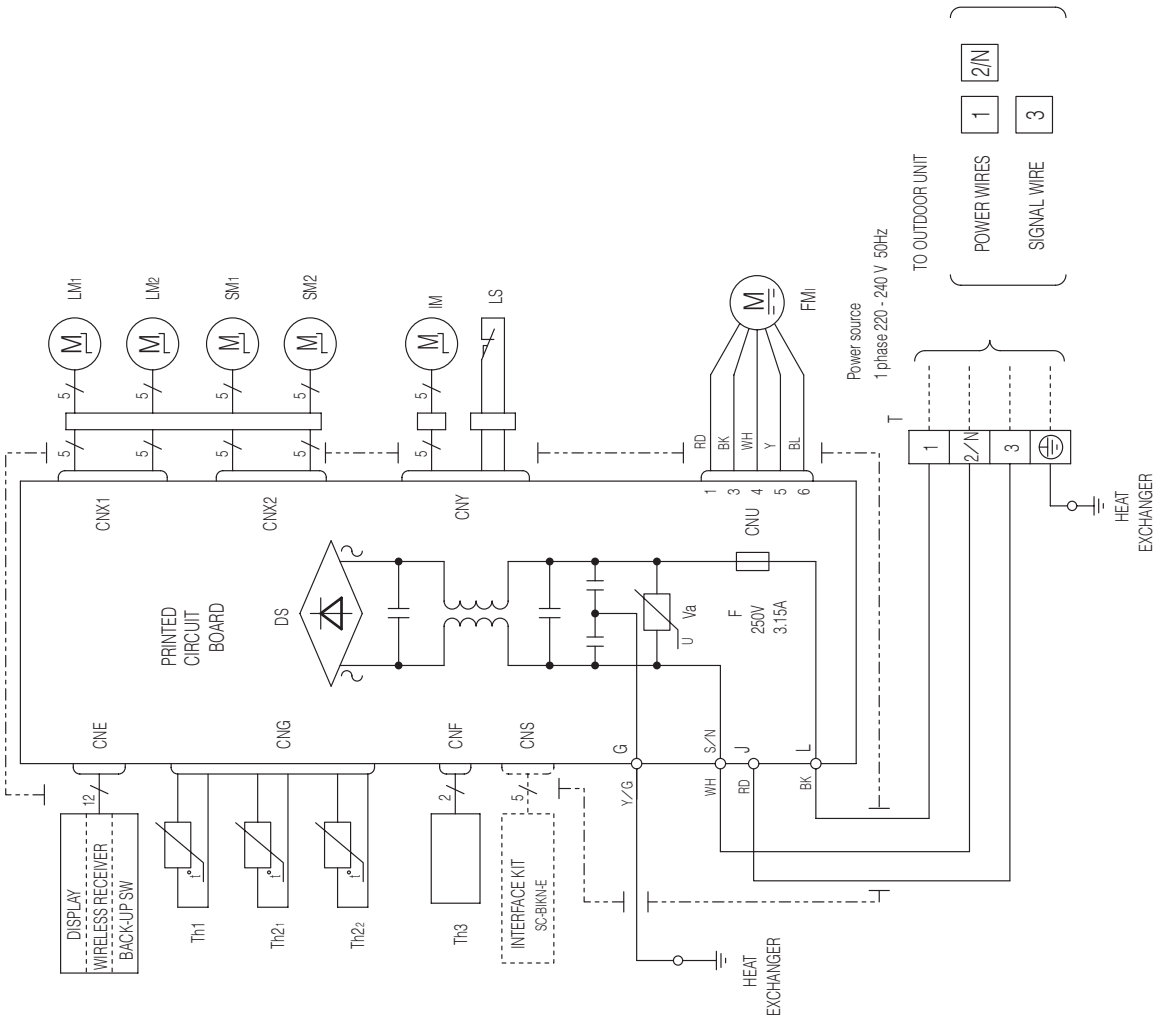
**(f) Wall mounted type (SRK)**

**Models SRK50ZIX-S, 60ZIX-S**

| Item | Description |
|---|---|
| CNE-CNY | Connector |
| $FM_I$ | Fan motor |
| $SM_{1,2}$ | Flap motor |
| $LM_{1,2}$ | Louver motor |
| IM | Inlet motor |
| Th1 | Room temp. sensor |
| $Th2_{1,2}$ | Heat exch. sensor |
| Th3 | Humidity sensor |
| LS | Limit switch |
| DS | Diode stack |
| F | Fuse |
| T | Terminal block |
| Va | Varistor |

Color Marks

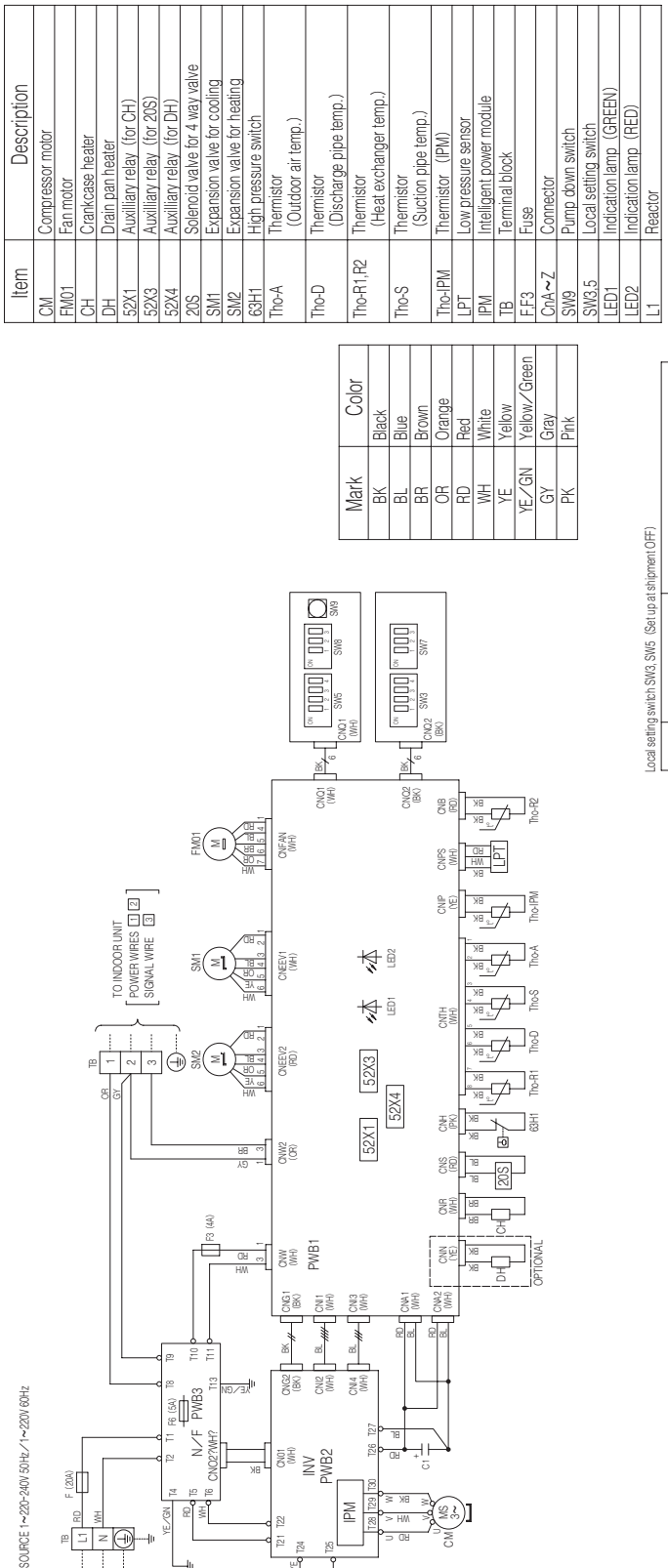
| Mark | Color |
|---|---|
| BK | Black |
| BL | Blue |
| RD | Red |
| WH | White |
| Y | Yellow |
| Y/G | Yellow/Green |




RWA000Z215

## (2) Outdoor units

### Model FDC71VNX




| Item | Description |
|---|---|
| CM | Compressor motor |
| FM01 | Fan motor |
| CH | Crankcase heater |
| DH | Drain pan heater |
| 52X1 | Auxiliary relay (for CH) |
| 52X3 | Auxiliary relay (for 20S) |
| 52X4 | Auxiliary relay (for DH) |
| 20S | Solenoid valve for 4 way valve |
| SM1 | Expansion valve for cooling |
| SM2 | Expansion valve for heating |
| 63H1 | High pressure switch |
| Tho-A | Thermistor (Outdoor air temp.) |
| Tho-D | Thermistor (Discharge pipe temp.) |
| Tho-R1,R2 | Thermistor (Heat exchanger temp.) |
| Tho-S | Thermistor (Suction pipe temp.) |
| Tho-IPM | Thermistor (IPM) |
| LPT | Low pressure sensor |
| IPM | Intelligent power module |
| TB | Terminal block |
| F,F3 | Fuse |
| CnA~Z | Connector |
| SW9 | Pump down switch |
| SW3,5 | Local setting switch |
| LED1 | Indication lamp (GREEN) |
| LED2 | Indication lamp (RED) |
| L1 | Reactor |

| Mark | Color |
|---|---|
| BK | Black |
| BL | Blue |
| BR | Brown |
| OR | Orange |
| RD | Red |
| WH | White |
| YE | Yellow |
| YE/GN | Yellow/Green |
| GY | Gray |
| PK | Pink |

Local setting switch SW3, SW5 (Set up at shipment OFF)

| | | |
|---|---|---|
| SW3-1 | Defrost control change | The defrosting operation interval becomes shorter by turning ON this switch. This switch should be turned ON in the area where outside temperature becomes below the freezing point. |
| SW3-2 | Snow guard fan control | When this switch is turned ON, the outdoor unit fan will run for 10 seconds in every 10 minutes, when outdoor temperature falls to 3°C or lower and the compressor is not running.When the unit is used in a very snowy country, set this switch to ON. |
| SW5-3,4 | Trial operation | Method of trial operation<br>1. Trial operation can be performed by using SW5-3.<br>2. Cooling trial operation will be performed when SW5-4 is OFF, and heating trial operation when SW5-4 is ON.<br>3. Be sure to turn OFF SW5-3 after the trial operation is finished. |

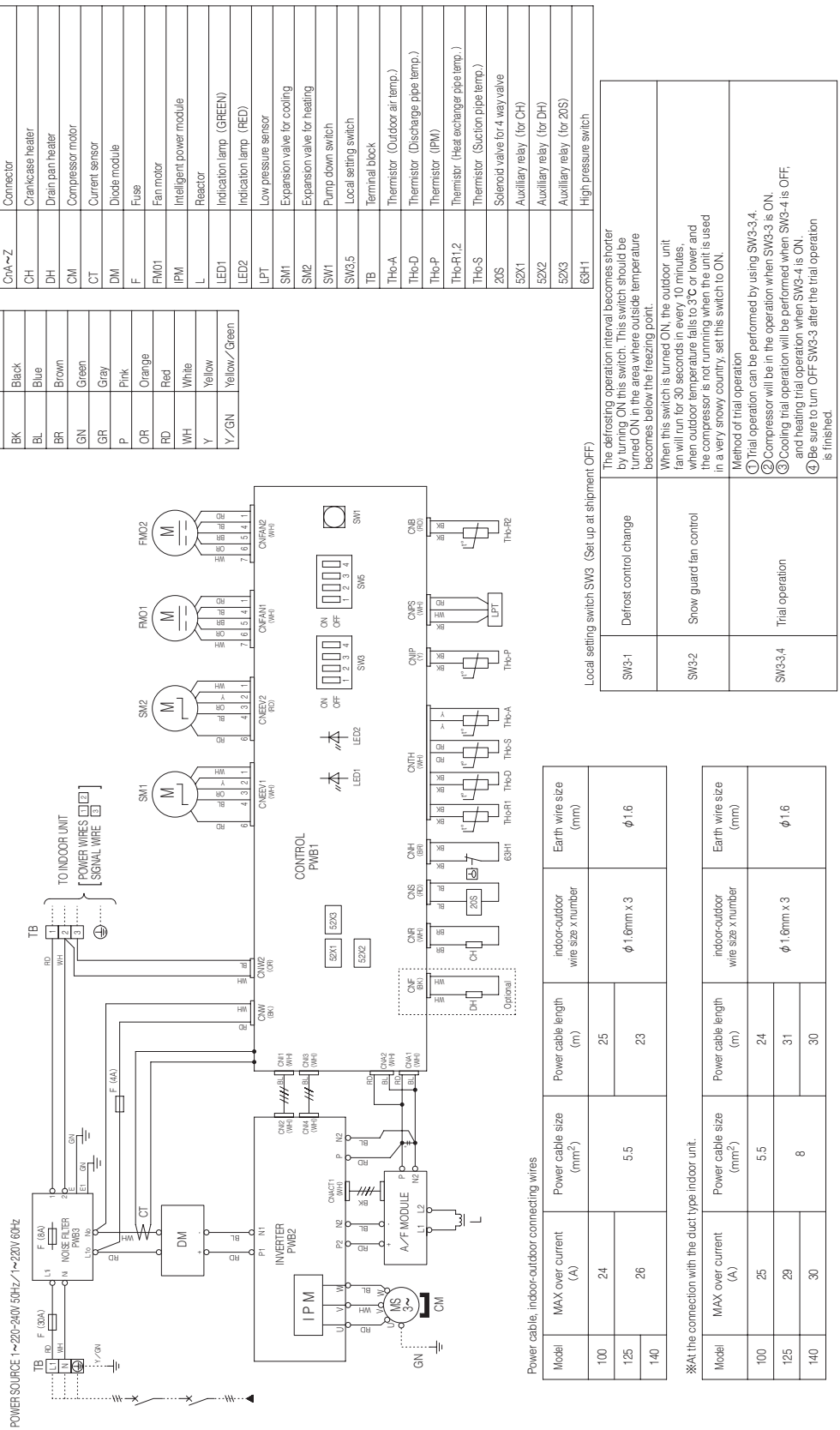
Power cable, indoor-outdoor connecting wires

| Model | MAX over current (A) | Power cable size ($mm^2$) | Power cable length (m) | indoor-outdoor wire size x number (mm) | Earth wire size (mm) |
|---|---|---|---|---|---|
| 71 | 17 | 3.5 | 21 | $\phi$1.6mm x 3 | $\phi$1.6mm |

- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear of Circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.
- Refer to installation manual or technical manual about usage of local setting switch.
  Don't operate SW3-3, SW5-1, SW5-2, SW7, SW8

PCA001Z605a

## Models FDC100VNX, 125VNX, 140VNX




| Item | Description |
|---|---|
| CnA~Z | Connector |
| CH | Crankcase heater |
| DH | Drain pan heater |
| CM | Compressor motor |
| CT | Current sensor |
| DM | Diode module |
| F | Fuse |
| FMO1 | Fan motor |
| IPM | Intelligent power module |
| L | Reactor |
| LED1 | Indication lamp. (GREEN) |
| LED2 | Indication lamp. (RED) |
| LPT | Low pressure sensor |
| SM1 | Expansion valve for cooling |
| SM2 | Expansion valve for heating |
| SW1 | Pump down switch |
| SW3,5 | Local setting switch |
| TB | Terminal block |
| THo-A | Thermistor (Outdoor air temp.) |
| THo-D | Thermistor (Discharge pipe temp.) |
| THo-P | Thermistor (IPM) |
| THo-R1,2 | Thermistr (Heat exchanger pipe temp.) |
| THo-S | Thermistor (Suction pipe temp.) |
| 20S | Solenoid valve for 4 way valve |
| 52X1 | Auxiliary relay (for CH) |
| 52X2 | Auxiliary relay (for DH) |
| 52X3 | Auxiliary relay (for 20S) |
| 63H1 | High pressure switch |

| Mark | Color |
|---|---|
| BK | Black |
| BL | Blue |
| BR | Brown |
| GN | Green |
| GR | Gray |
| P | Pink |
| OR | Orange |
| RD | Red |
| WH | White |
| Y | Yellow |
| Y/GN | Yellow/Green |

Local setting switch SW3 (Set up at shipment OFF)

| | | |
|---|---|---|
| SW3-1 | Defrost control change | The defrosting operation interval becomes shorter by turning ON this switch. This switch should be turned ON in the area where outside temperature becomes below the freezing point. |
| SW3-2 | Snow guard fan control | When this switch is turned ON, the outdoor unit fan will run for 30 seconds in every 10 minutes, when outdoor temperature falls to 3°C or lower and the compressor is not running when the unit is used in a very snowy country, set this switch to ON. |
| SW3-3,4 | Trial operation | Method of trial operation<br>①Trial operation can be performed by using SW3-3,4.<br>②Compressor will be in the operation when SW3-3 is ON.<br>③Cooling trial operation will be performed when SW3-4 is OFF, and heating trial operation when SW3-4 is ON.<br>④Be sure to turn OFF SW3-3 after the trial operation is finished. |

Power cable, indoor-outdoor connecting wires

| Model | MAX over current (A) | Power cable size ($mm^2$) | Power cable length (m) | indoor-outdoor wire size x number | Earth wire size (mm) |
|---|---|---|---|---|---|
| 100 | 24 | 5.5 | 25 | φ1.6mm x 3 | φ1.6 |
| 125 | 26 | | 23 | | |
| 140 | | | | | |

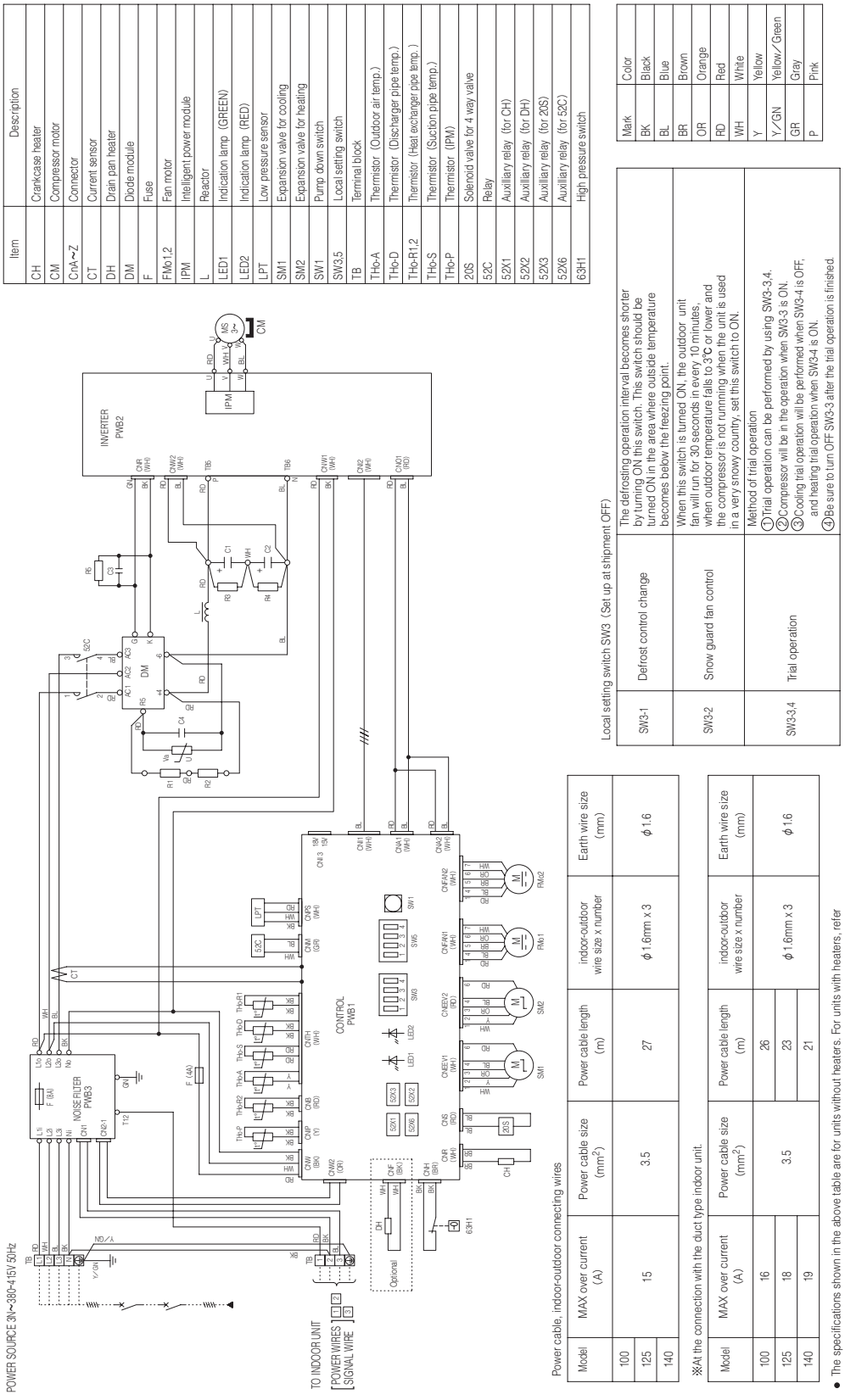
※At the connection with the duct type indoor unit.

| Model | MAX over current (A) | Power cable size ($mm^2$) | Power cable length (m) | indoor-outdoor wire size x number | Earth wire size (mm) |
|---|---|---|---|---|---|
| 100 | 25 | 5.5 | 24 | φ1.6mm x 3 | φ1.6 |
| 125 | 29 | 8 | 31 | | |
| 140 | 30 | | 30 | | |

- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear of Circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

PCA001Z570A

## Models FDC100VSX, 125VSX, 140VSX




| Item | Description |
|---|---|
| CH | Crankcase heater |
| CM | Compressor motor |
| CnA~Z | Connector |
| CT | Current sensor |
| DH | Drain pan heater |
| DM | Diode module |
| F | Fuse |
| FMo1,2 | Fan motor |
| IPM | Intelligent power module |
| L | Reactor |
| LED1 | Indication lamp (GREEN) |
| LED2 | Indication lamp (RED) |
| LPT | Low pressure sensor |
| SM1 | Expansion valve for cooling |
| SM2 | Expansion valve for heating |
| SW1 | Pump down switch |
| SW3,5 | Local setting switch |
| TB | Terminal block |
| THo-A | Thermistor (Outdoor air temp.) |
| THo-D | Thermistor (Discharger pipe temp.) |
| THo-R1,2 | Thermistor (Heat exchanger pipe temp.) |
| THo-S | Thermistor (Suction pipe temp.) |
| THo-P | Thermistor (IPM) |
| 20S | Solenoid valve for 4 way valve |
| 52C | Relay |
| 52X1 | Auxiliary relay (for CH) |
| 52X2 | Auxiliary relay (for DH) |
| 52X3 | Auxiliary relay (for 20S) |
| 52X6 | Auxiliary relay (for 52C) |
| 63H1 | High pressure switch |

| Mark | Color |
|---|---|
| BK | Black |
| BL | Blue |
| BR | Brown |
| OR | Orange |
| RD | Red |
| WH | White |
| Y | Yellow |
| Y/GN | Yellow/Green |
| GR | Gray |
| P | Pink |

Local setting switch SW3 (Set up at shipment OFF)

| | | |
|---|---|---|
| SW3-1 | Defrost control change | The defrosting operation interval becomes shorter by turning ON this switch. This switch should be turned ON in the area where outside temperature becomes below the freezing point. |
| SW3-2 | Snow guard fan control | When this switch is turned ON, the outdoor unit fan will run for 30 seconds in every 10 minutes, when outdoor temperature falls to 3℃ or lower and the compressor is not running when the unit is used in a very snowy country, set this switch to ON. |
| SW3-3,4 | Trial operation | Method of trial operation<br>①Trial operation can be performed by using SW3-3,4.<br>②Compressor will be in the operation when SW3-3 is ON.<br>③Cooling trial operation will be performed when SW3-4 is OFF, and heating trial operation when SW3-4 is ON.<br>④Be sure to turn OFF SW3-3 after the trial operation is finished. |

Power cable, indoor-outdoor connecting wires

| Model | MAX over current (A) | Power cable size ($mm^2$) | Power cable length (m) | indoor-outdoor wire size x number | Earth wire size (mm) |
|---|---|---|---|---|---|
| 100 | 15 | 3.5 | 27 | $\phi$ 1.6mm x 3 | $\phi$ 1.6 |
| 125 | | | | | |
| 140 | | | | | |

※At the connection with the duct type indoor unit.

| Model | MAX over current (A) | Power cable size ($mm^2$) | Power cable length (m) | indoor-outdoor wire size x number | Earth wire size (mm) |
|---|---|---|---|---|---|
| 100 | 16 | 3.5 | 26 | $\phi$ 1.6mm x 3 | $\phi$ 1.6 |
| 125 | 18 | | 23 | | |
| 140 | 19 | | 21 | | |

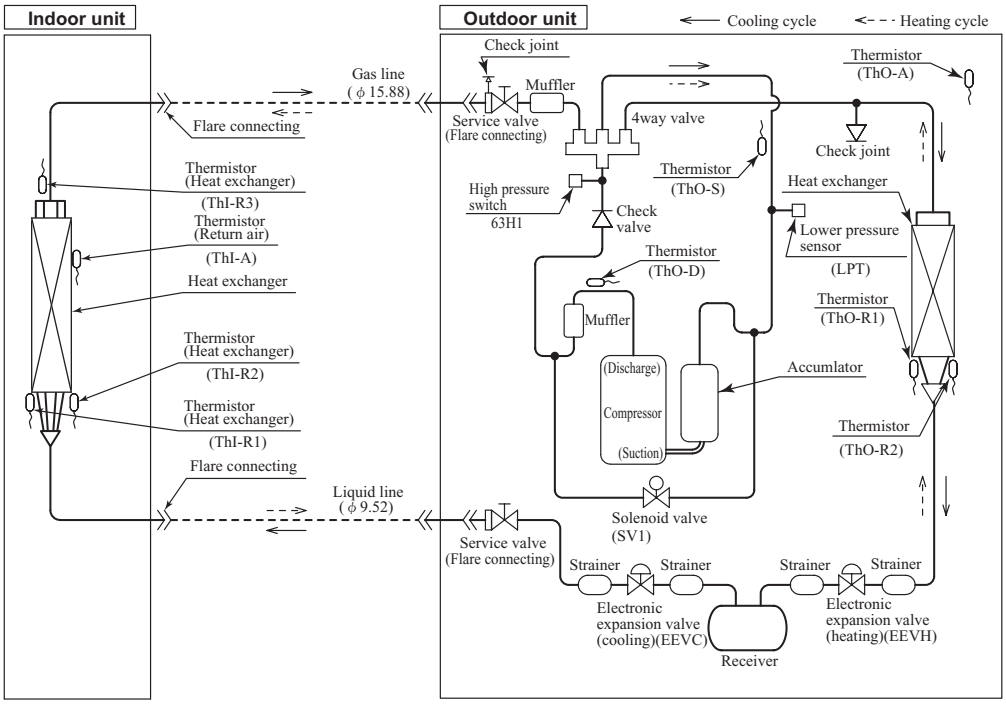
- The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
- Switchgear of Circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
- The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, please follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

PCA001Z571 A

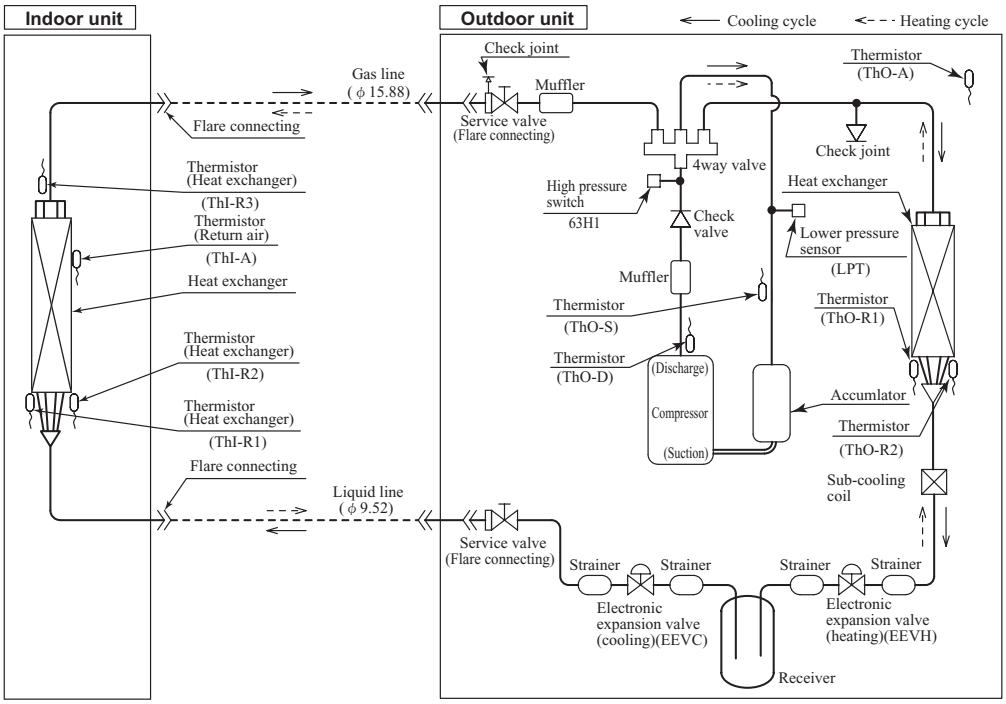
# 4. PIPING SYSTEM

## (1) Single type

### Model 71

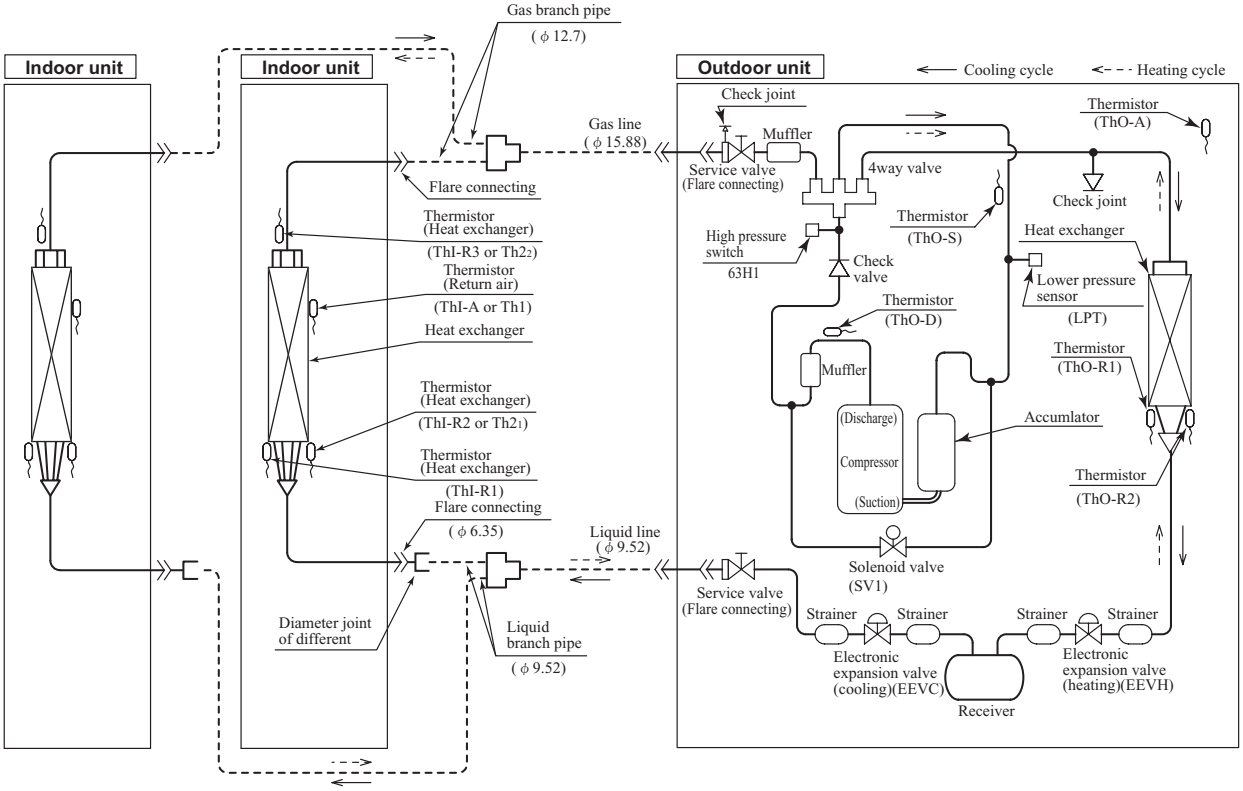



### Models 100,125,140

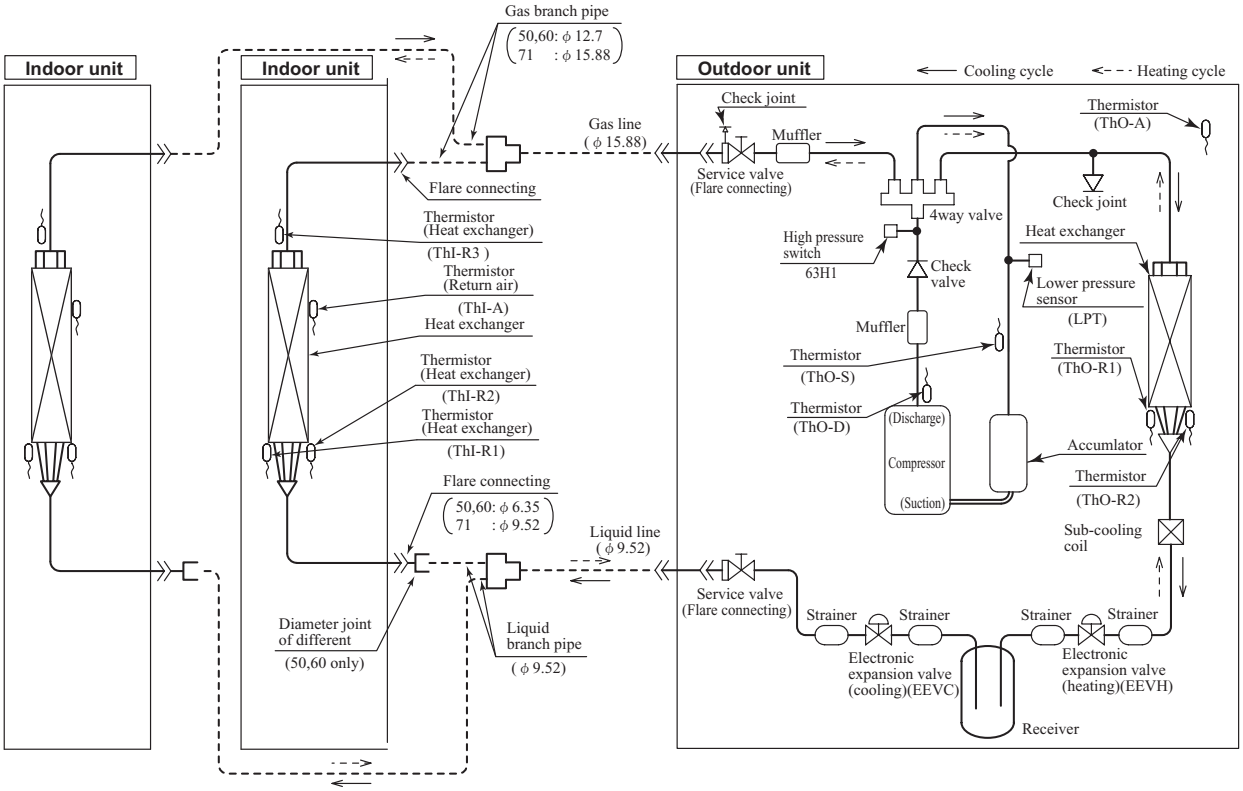


## (2) Twin type

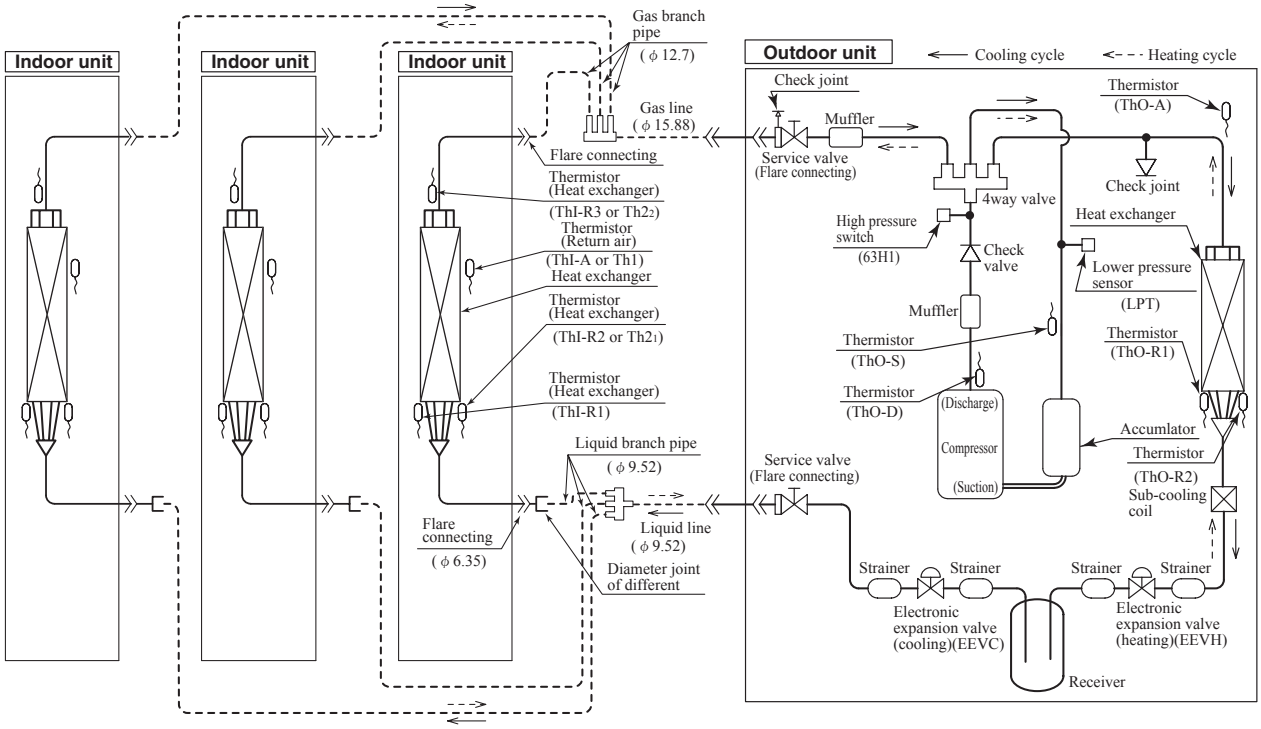
### Model 71




### Models 100,125,140



### (3) Triple type
### Model 140




# Preset point of the protective devices

| Parts name | Mark | Equipped unit | 71,100,125, 140 model |
|---|---|---|---|
| **Thermistor (for protection overloading in heating)** | **ThI-R (Th2)** | Indoor unit | OFF 63(62)℃<br>ON 56(48.5)℃ |
| **Thermistor (for frost prevention)** | | | OFF 1.0(2.5)℃<br>ON 10(8)℃ |
| **Thermistor (for protection high pressure in cooling.)** | **Tho-R** | Outdoor unit | OFF 51℃<br>ON 65℃ |
| **Thermistor (for detecting discharge pipe temp.)** | **Tho-D** | Outdoor unit | OFF 115℃<br>ON 85℃ |
| **High pressure switch (for protection)** | **63H1** | Outdoor unit | OFF 4.15MPa<br>ON 3.15MPa |
| **Low pressure sensor (for protection)** | **LPT** | Outdoor unit | OFF 0.227MPa<br>ON 0.079MPa |

Note(1) Values in ( ) show in the case of model SRK .

# 5 APPLICATION DATA

## 5.1 Installation of indoor unit

PJA012D786

### (1) Ceiling cassette-4way compact type (FDTC)

This manual is for the installation of an indoor unit.
For electrical wiring work (Indoor), refer to the electrical wiring work installation manual. For remote controller installation, refer to the installation manual attached to a remote controller. For wireless kit installation, refer to the installation manual attached to a wireless kit. For electrical wiring work (Outdoor) and refrigerant pipe work installation for outdoor unit, refer to the installation manual attached to an outdoor unit.
This unit must always be used with the panel.

#### SAFETY PRECAUTIONS

- Read the "SAFETY PRECAUTIONS" carefully first of all and then strictly follow it during the installation work in order to protect yourself.
- The precautionary items mentioned below are distinguished into two levels, ⚠WARNING and ⚠CAUTION .
  ⚠WARNING : Wrong installation would cause serious consequences such as injuries or death.
  ⚠CAUTION : Wrong installation might cause serious consequences depending on circumstances.
  Both mentions the important items to protect your health and safety so strictly follow them by any means.
- The meanings of "Marks" used here are as shown as follows:
  ⃠ Never do it under any circumstances. ❶ Always do it according to the instruction.
- After completing the installation, do commissioning to confirm there are no abnormalities, and explain to the customers about "SAFETY PRECAUTIONS", correct operation method and maintenance method (air filter cleaning, operation method and temperature setting method) with user's manual of this unit.
  Ask your customers to keep this installation manual together with the user's manual. Also, ask them to hand over the user's manual to the new user when the owner is changed.

#### ⚠WARNING

- **Installation should be performed by the specialist.**
  If you install the unit by yourself, it may lead to serious trouble such as water leakage, electric shock, fire, and injury due to overturn of the unit.
- **Install the system correctly according to these installation manuals.**
  Improper installation may cause explosion, injury, water leakage, electric shock, and fire.
- **When installing in small rooms, take prevention measures not to exceed the density limit of refrigerant in the event of leakage, referred by the formula (accordance with ISO5149).**
  If the density of refrigerant exceeds the limit, please consult the dealer and install the ventilation system, otherwise lack of oxygen can occur, which can cause serious accidents.
- **Use the genuine accessories and the specified parts for installation.**
  If parts unspecified by our company are used it could cause water leakage, electric shock, fire, and injury due to overturn of the unit.
- **Ventilate the working area well in case the refrigerant leaks during installation.**
  If the refrigerant contacts the fire, toxic gas is produced.
- **Install the unit in a location that can hold heavy weight.**
  Improper installation may cause the unit to fall leading to accidents.
- **Install the unit properly in order to be able to withstand strong winds such as typhoons, and earthquakes.**
  Improper installation may cause the unit to fall leading to accidents.
- **Do not mix air in to the cooling cycle on installation or removal of the air conditioner.**
  If air is mixed in, the pressure in the cooling cycle will rise abnormally and may cause explosion and injuries.
- **Be sure to have the electrical wiring work done by qualified electrical installer, and use exclusive circuit.**
  Power source with insufficient capacity and improper work can cause electric shock and fire.
- **Use specified wire for electrical wiring, fasten the wiring to the terminal securely, and hold the cable securely in order not to apply unexpected stress on the terminal.**
  Loose connections or hold could result in abnormal heat generation or fire.
- **Arrange the electrical wires in the control box properly to prevent them from rising. Fit the lid of the services panel property.**
  Improper fitting may cause abnormal heat and fire.
- **Check for refrigerant gas leakage after installation is completed.**
  If the refrigerant gas leaks into the house and comes in contact with a fan heater, a stove, or an oven, toxic gas is produced.
- **Use the specified pipe, flare nut, and tools for R410A.**
  Using existing parts (R22) could cause the unit failure and serious accident due to explosion of the cooling cycle.
- **Tighten the flare nut according to the specified method by with torque wrench.**
  If the flare nut were tightened with excess torque, it could cause burst and refrigerant leakage after a long period.
- **Do not put the drainage pipe directly into drainage channels where poisonous gases such as sulfide gas can occur.**
  Poisonous gases will flow into the room through drainage pipe and seriously affect the user's health and safety. This can also cause the corrosion of the indoor unit and a resultant unit failure or refrigerant leak.
- **Connect the pipes for refrigeration circuit securely in installation work before compressor is operated.**
  If the compressor is operated when the service valve is open without connecting the pipe, it could cause explosion and injuries due to abnormal high pressure in the system.
- **Stop the compressor before removing the pipe after shutting the service valve on pump down work.**
  If the pipe is removed when the compressor is in operation with the service valve open, air would be mixed in the refrigeration circuit and it could cause explosion and injuries due to abnormal high pressure in the cooling cycle.
- **Only use prescribed optional parts. The installation must be carried out by the qualified installer.**
  If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- **Do not repair by yourself. And consult with the dealer about repair.**
  Improper repair may cause water leakage, electric shock or fire.
- **Consult the dealer or a specialist about removal of the air conditioner.**
  Improper installation may cause water leakage, electric shock or fire.
- **Turn off the power source during servicing or inspection work.**
  If the power is supplied during servicing or inspection work, it could cause electric shock and injury by the operating fan.
- **Do not run the unit when the panel or protection guard are taken off.**
  Touching the rotating equipment, hot surface, or high voltage section could cause an injury to be caught in the machine, to get burned, or electric shock.
- **Shut off the power before electrical wiring work.**
  It could cause electric shock, unit failure and improper running.

#### ⚠ CAUTION

- **Perform earth wiring surely.**
  Do not connect the earth wiring to the gas pipe, water pipe, lightning rod and telephone earth wiring. Improper earth could cause unit failure and electric shock due to a short circuit.
- **Earth leakage breaker must be installed.**
  If the earth leakage breaker is not installed, it can cause electric shocks.
- **Use the circuit breaker of correct capacity. Circuit breaker should be the one that disconnect all poles under over current.**
  Using the incorrect one could cause the system failure and fire.
- **Do not use any materials other than a fuse of correct capacity where a fuse should be used.**
  Connecting the circuit by wire or copper wire could cause unit failure and fire.
- **Do not install the indoor unit near the location where there is possibility of flammable gas leakages.**
  If the gas leaks and gathers around the unit, it could cause fire.
- **Do not install and use the unit where corrosive gas (such as sulfurous acid gas etc.) or flammable gas (such as thinner, petroleum etc.) may be generated or accumulated, or volatile flammable substances are handled.**
  It could cause the corrosion of heat exchanger, breakage of plastic parts etc. And inflammable gas could cause fire.
- **Secure a space for installation, inspection and maintenance specified in the manual.**
  Insufficient space can result in accident such as personal injury due to falling from the installation place.
- **Do not use the indoor unit at the place where water splashes such as laundry.**
  Indoor unit is not waterproof. It could cause electric shock and fire.
- **Do not use the indoor unit for a special purpose such as food storage, cooling for precision instrument, preservation of animals, plants, and a work of art.**
  It could cause the damage of the items.
- **Do not install nor use the system near equipments which generate electromagnetic wave or high harmonics.**
  Equipments like inverter equipment, private power generator, high-frequency medical equipment, or telecommunication equipment might influence the air conditioner and cause a malfunction and breakdown. Or the air conditioner might influence medical equipments or telecommunication equipments, and obstruct their medical activity or cause jamming.
- **Do not install the remote controller at the direct sunlight.**
  It could cause breakdown or deformation of the remote controller.
- **Do not install the indoor unit at the place listed below.**
  - Places where flammable gas could leak.
  - Places where carbon fiber, metal powder or any powder is floated.
  - Place where the substances which affect the air conditioner are generated such as sulfide gas, chloride gas, acid, alkali or ammonic atmospheres.
  - Places exposed to oil mist or steam directly.
  - On vehicles and ships
  - Places where machinery which generates high harmonics is used.
  - Places where cosmetics or special sprays are frequently used.
  - Highly salted area such as beach.
  - Heavy snow area
  - Places where the system is affected by smoke from a chimney.
  - Altitude over 1000m
- **Do not install the indoor unit in the locations listed below (Be sure to install the indoor unit according to the installation manual for each model because each indoor unit has each limitation)**
  - Locations with any obstacles which can prevent inlet and outlet air of the unit
  - Locations where vibration can be amplified due to insufficient strength of structure.
  - Locations where the infrared receiver is exposed to the direct sunlight or the strong light beam. (in case of the infrared specification unit)
  - Locations where an equipment affected by high harmonics is placed. (TV set or radio receiver is placed within 5m)
  - Locations where drainage cannot run off safely.

  It can affect performance or function and etc..
- **Do not put any valuables which will break down by getting wet under the air conditioner.**
  Condensation could drop when the relative humidity is higher than 80% or drain pipe is clogged, and it damages user's belongings.
- **Do not use the base frame for the outdoor unit which is corroded or damaged after a long period of use.**
  It could cause the unit falling down and injury.
- **Pay attention not to damage the drain pan by weld sputter when brazing work is done near the unit.**
  If sputter entered into the unit during brazing work, it could cause damage (pinhole) of drain pan and leakage of water. To avoid damaging, keep the indoor unit packed or cover the indoor unit.
- **Install the drain pipe to drain the water surely according to the installation manual.**
  Improper connection of the drain pipe may cause dropping water into room and damaging user's belongings.
- **Do not share the drain pipe for indoor unit and GHP (Gas Heat Pump system) outdoor unit.**
  Toxic exhaust gas would flow into room and it might cause serious damage (some poisoning or deficiency of oxygen) to user's health and safety.
- **Be sure to perform air tightness test by pressurizing with nitrogen gas after completed refrigerant piping work.**
  If the density of refrigerant exceeds the limit in the event of refrigerant leakage in the small room, lack of oxygen can occur, which can cause serious accidents.
- **For drain pipe installation, be sure to make descending slope of greater than 1/100, not to make traps, and not to make air-bleeding.**
  Check if the drainage is correctly done during commissioning and ensure the space for inspection and maintenance.
- **Ensure the insulation on the pipes for refrigeration circuit so as not to condense water.**
  Incomplete insulation could cause condensation and it would wet ceiling, floor, and any other valuables.
- **Do not install the outdoor unit where is likely to be a nest for insects and small animals.**
  Insects and small animals could come into the electronic components and cause breakdown and fire. Instruct the user to keep the surroundings clean.
- **Pay extra attention, carrying the unit by hand.**
  Carry the unit with 2 people if it is heavier than 20kg. Do not use the plastic straps but the grabbing place, moving the unit by hand. Use protective gloves in order to avoid injury by the aluminum fin.
- **Make sure to dispose of the packaging material.**
  Leaving the materials may cause injury as metals like nail and woods are used in the package.
- **Do not operate the system without the air filter.**
  It may cause the breakdown of the system due to clogging of the heat exchanger.
- **Do not touch any button with wet hands.**
  It could cause electric shock.
- **Do not touch the refrigerant piping with bare hands when in operation.**
  The pipe during operation would become very hot or cold according to the operating condition, and it could cause a burn or frostbite.
- **Do not clean up the air conditioner with water.**
  It could cause electric shock.
- **Do not turn off the power source immediately after stopping the operation.**
  Be sure to wait for more than 5 minutes. Otherwise it could cause water leakage or breakdown.
- **Do not control the operation with the circuit breaker.**
  It could cause fire or water leakage. In addition, the fan may start operation unexpectedly and it may cause injury.

## ① Before installation

- Install correctly according to the installation manual.
- Confirm the following points:
  ○ Unit type/Power supply specification ○ Pipes/Wires/Small parts ○ Accessory items

Accessory itme

| For unit hanging | | For refrigerant pipe | | | For draom pipe | | | |
|---|---|---|---|---|---|---|---|---|
| Flat washer (M10) | Level gauge (Insulation) | Pipe cover(big) | Pipe cover (small) | Strap | Pipe cover(big) | Pipe cover(small) | Drain hose | Hose clamp |
| | | | | | | | | |
| 8 | 4 | 1 | 1 | 4 | 1 | 1 | 1 | 1 |
| For unit hanging | For adjustment in hoisting in the unit's main body | For heat insulation of gas pipe | For heat insulation of liquid tube | For pipe cover fixing | For heat insulation of drain socket | For heat insulation of drain socket | For drain pipe connecting | For drain hose mounting |

## ② Selection of installation location for the indoor unit

① Select the suitable areas to install the unit under approval of the user.
- Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 28°C and relative humidity is lower than 80%.
  This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
  If there is a possibility to use it under such a condition, attach additional insulation of 10 to 20mm thick for entire surface of indoor unit, refrigeration pipe and drain pipe.
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.
- Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
  (A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

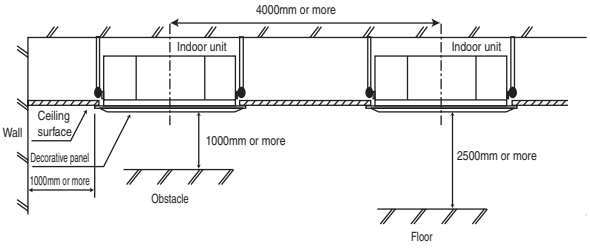
② Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

③ If there are 2 units of wireless type, keep them away for more than 5m to avoid malfunction due to cross communication.

④ When plural indoor units are installed nearby, keep them away for more than 4m.

Space for installation and service

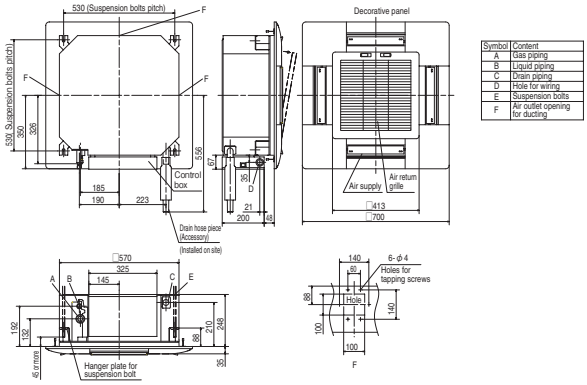
- When it is not possible to keep enough space between indoor unit and wall or between indoor units, close the air supply port where it is not possible to keep space and confirm there is no short circuit of airflow.
- Install the indoor unit at a height of more than 2.5m above the floor.




## ③ Preparation before installation

- If suspension bolt becomes longer, do reinforcement of earthquake resistant.
  ○ For grid ceiling
  When suspension bolt length is over 500mm, or the gap between the ceiling and roof is over 700mm, apply earthquake resistant brace to the bolt.
  ○ In case the unit is hanged directly from the slab and is installed on the ceiling plane which has enough strength.
  When suspension bolt length is over 1000mm, apply the earthquake resistant brace to the bolt.
- Prepare four (4) sets of suspension bolt, nut and spring washer (M10 or M8) on site.

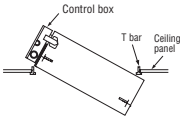
Ceiling opening, Suspension bolts pitch, Pipe position



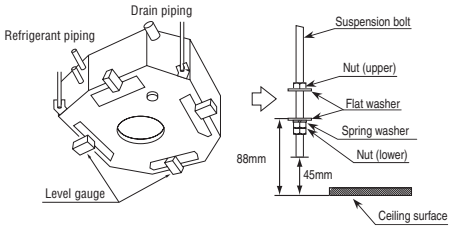

## ④ Installation of indoor unit

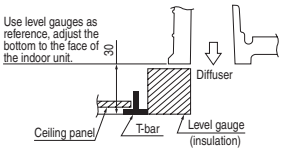
Work procedure

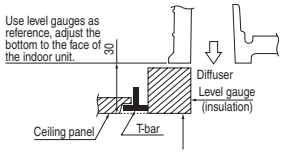
1. This units is designed for 2 x 2 grid ceiling.
   If necessary, please detach the T bar temporarily before you install it.
   If it is installed on a ceiling other than 2 x 2 grid ceiling, provide an inspection port on the control box side.
2. Arrange the suspension bolt at the right position (530mm×530mm).
3. Make sure to use four suspension bolts and fix them so as to be able to hold 500N load.
4. Ensure that the lower end of the suspension bolt should be 45mm above the ceiling plane. Temporarily put the four lower nuts 88mm above the ceiling plane and the upper nuts on distant place from the lower nuts in order not to obstruct hanging the indoor unit or adjust the indoor unit position, and then hang the indoor unit.



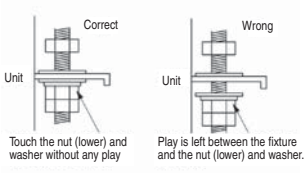

5. Adjust the indoor unit position after hanging it by inserting the level gauge attached on the package into the air supply port and checking if the gap between the ceiling plane and the indoor unit is appropriate. In order to adjust the indoor unit position, adjust the lower nuts while the upper nuts are put on distant place. Confirm there is no backlash between the hanger plate for suspension bolt and the lower nut and washer.



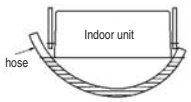




When the ceiling panel comes below the T bar, align the bottom of the level gauge to the lower face of the ceiling panel.


Correct
Unit
Touch the nut (lower) and washer without any play
Wrong
Unit
Play is left between the fixture and the nut (lower) and washer.

## ④ Installation of indoor unit (continued)

6. Make sure to install the indoor unit horizontally. Confirm the levelness of the indoor unit with a level gauge or transparent hose filled with water. Keep the height difference at both ends of the indoor unit within 3mm.
7. Tighten four upper nuts and fix the unit after height and levelness adjustment.




Caution

- Do not adjust the height by adjusting upper nuts. It will cause unexpected stress on the indoor unit and it will lead to deformation of the unit, failure of attaching a panel, and generating noise from the fan.
- Make sure to install the indoor unit horizontally and set the gap between the unit underside and the ceiling plane properly. Improper installation may cause air leakage, dew condensation, water leakage and noise.
- Even after decorative panel attached, still the unit height can be adjusted finely. Refer to the installation manual for decorative panel for details.
- Make sure there is no gap between decoration panel and ceiling surface, and between decoration panel and the indoor unit. The gap may cause air leakage, dew condensation and water leakage.
- In case decorative panel is not installed at the same time, or ceiling material is installed after the unit installed, put the cardboard template for installation attached on the package (packing material of cardboard box) on the bottom of the unit in order to avoid dust coming into the indoor unit.

## ⑤ Refrigerant pipe

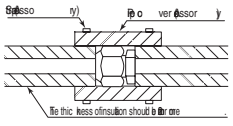
Caution

- Use the new refrigerant pipe.
  When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
  - Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
  - Do not use thin-walled pipes.
- Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
  In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.
- Do not use any refrigerant other than R410A.
  Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.
- Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.
- Use special tools for R410 refrigerant.

Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit.
   ※ Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   (Gas may come out at this time, but it is not abnormal.)
   - Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
   ※ Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
   ※ Do a flare connection as follows:
   - Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   - When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
   - Make sure to insulate both gas pipes and liquid pipes completely.
     ※ Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit.
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

| Pipe diameter | Tightening torque N·m |
|---|---|
| ϕ 6.35 | 14 to 18 |
| ϕ 9.52 | 34 to 42 |
| ϕ 12.7 | 49 to 61 |
| ϕ 15.88 | 68 to 82 |
| ϕ 19.05 | 100 to 120 |




## ⑥ Drain pipe

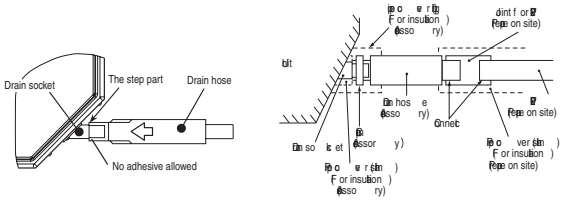
Caution

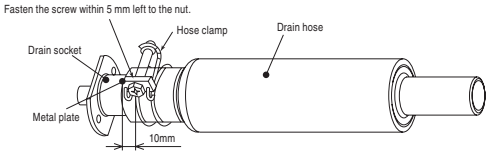
- Install the drain pipe according to the installation manual in order to drain properly.
  Imperfection in draining may cause flood indoors and wetting the household goods etc.
- Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.
- Connect the pipe securely to avoid water leakage from the joint.
- Insulate the pipe properly to avoid condensation drop.
- Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.
- Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

## ⑥ Drain pipe (continued)

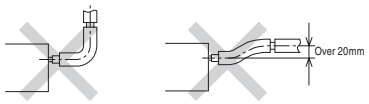
Work procedure

1. Make sure to insert the drain hose (the end mode of soft PVC) to the end of the step part of drain socket.
   Attach the hose clamp to the drain hose around 10mm from the end, and fasten the screw within 5mm left to the nut.
   - Do not apply adhesives on this end.

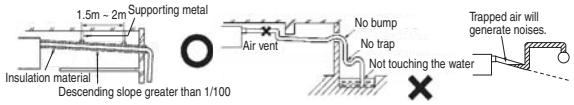


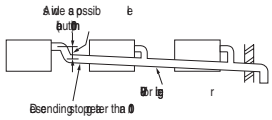

2. Prepare a joint for connecting VP-20 pipe, adhere and connect the joint to the drain hose (the end made of rigid PVC), and adhere and connect VP-20 pipe (prepare on site).
   ※ As for drain pipe, apply VP-20 made of rigid PVC which is on the market.
   - Make sure that the adhesive will not get into the supplied drain hose.
     It may cause the flexible part broken after the adhesive is dried up and gets rigid.
   - Do not bend or make an excess offset on the drain hose as shown in the picture.
     Bend or excess offset will cause drain leakage.




3. Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway.
   - Pay attention not to give stress on the pipe on the indoor unit side, and support and fix the pipe as close place to the unit as possible when connecting the drain pipe.
   - Do not set up air vent.



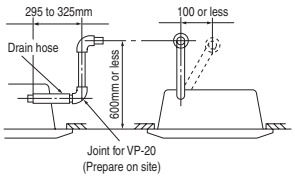

   - When sharing a drain pipe for more than one unit, lay the main pipe 100mm below the drain outlet of the unit. In addition, select VP-30 or bigger size for main drain pipe.




4. Insulate the drain pipe.
   - Be sure to insulate the drain socket and rigid PVC pipe installed indoors otherwise it may cause dew condensation and water leakage.
     ※ After drainage test implementation, cover the drain socket part with pipe cover (small size), then use the pipe cover (big size) to cover the pipe cover (small size), clamps and part of the drain hose, and fix and wrap it with tapes to wrap and make joint part gapless.

Drain up

- The position for drain pipe outlet can be raised up to 600mm above the ceiling. Use elbows for installation to avoid obstacles inside ceiling. If the horizontal drain pipe is too long before vertical pipe, the backflow of water will increase when the unit is stopped, and it may cause overflow of water from the drain pan on the indoor unit. In order to avoid overflow, keep the horizontal pipe length and offset of the pipe within the limit shown in the figure below.

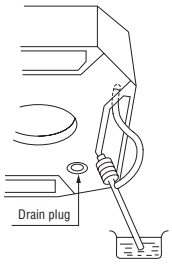


## ⑥ Drain pipe (continued)

Drain test

- After installation of drain pipe, make sure that drain system work in good condition and no water leakage from joint and drain pan. Check if the motor sound of drain pump is normal or not.
- Do drain test even if installation of heating season.
- For new building cases, make sure to complete the test before hanging the ceiling.

1. Pour water of about 1000cc into the drain pan in the indoor unit by pump so as not to get the electrical component wet.
2. Make sure that water is drained out properly and there is no water leakage from any joints of the drain pipe at the test.
   Confirm that the water is properly drained out while the drain motor is operating. At the drain socket (transparent), it is possible to check if the water is drained out properly.
3. Unplug the drain plug on the indoor unit to remove remaining water on the drain pan after the test, and re-plug it. And insulate the drain pipe properly finally.




Drain pump operation

○ In case electrical wiring work finished
Drain pump can be operated by remote controller (wired).
For the operation method, refer to Operation for drain pump in the installation manual for wiring work.

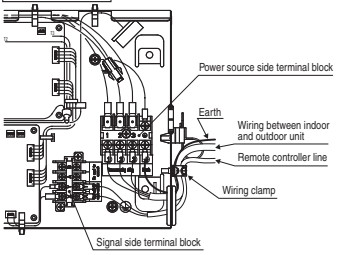
○ In case electrical wiring work not finished
Drain pump will run continuously when the dip switch"SW7-1" on the indoor unit PCB is turned ON, the Connector CNB is disconnected, and then the power supply (220-240VAC on the terminal block [ ① and ② ] or [ Ⓛ and Ⓝ ] ) is turned ON.
Make sure to turn OFF "SW7-1" and reconnect the Connector CNB after the test.

## ⑦ Wiring-out position and wiring connection

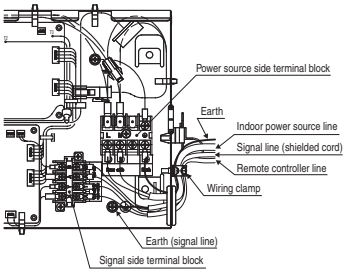
- Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country. Be sure to use an exclusive circuit.
- Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
- Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
- Be sure to do D type earth work.
- For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

1. Remove a lid of the control box (1 screws).
2. Hold each wiring inside the unit and fasten them to terminal block securely.
3. Fix the wiring with clamp.
4. Install a lid of the control box back to original place.

Single split (PAC) series




VRF (KX) series




## ⑧ Panel installation

- After wiring work finished, install the panel on the indoor unit.
- Refer to attached panel installation manual for details. (see next page)

Accessory items

| | | | | |
|---|---|---|---|---|
| 1 | Hook | | 1 piece | For fixing temporarily |
| 2 | Chain | | 2 pieces | |
| 3 | Bolt | | 4 pieces | For installing the panel |
| 4 | Screw | | 1 piece | For attaching a hook |
| 5 | Screw | | 2 pieces | For attaching a chain |

- Attach the panel on the indoor unit after electrical wiring work.
- Refer to attached manual for panel installation for details. (See next page)

## ⑨ Check list after installation

- Check the following items after all installation work completed.

| Check if | Expected trouble | Check |
|---|---|---|
| The indoor and outdoor units are fixed securely? | Falling, vibration, noise | |
| Inspection for leakage is done? | Insufficient capacity | |
| Insulation work is properly done? | Water leakage | |
| Water is drained properly? | Water leakage | |
| Supply voltage is same as mentioned in the model name plate? | PCB burnt out, not working at all | |
| There is mis-wiring or mis-connection of piping? | PCB burnt out, not working at all | |
| Earth wiring is connected properly? | Electric shock | |
| Cable size comply with specified size? | PCB burnt out, not working at all | |
| Any obstacle blocks airflow on air inlet and outlet? | Insufficient capacity | |

# PANEL INSTALLATION MANUAL

PJA012D783 a

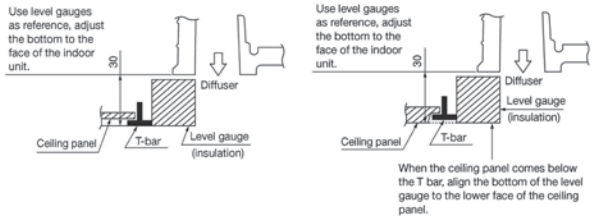
Please read this manual together with the indoor unit's installation manual.

## ⚠ WARNING

- **Fasten the wiring to the terminal securely and hold the cable securely so as not to apply unexpected stress on the terminal.**
  Loose connection or hold will cause abnormal heat generation or fire.
- **Make sure the power supply is turned off when electric wiring work.**
  Otherwise, electric shock, malfunction and improper running may occur.

## ① Checking the indoor unit installation position

- Read this manual together with the air conditioner installation manual carefully.
- Check if the gap between the ceiling plane and the indoor unit is correct by inserting the level gauge into the air outlet port of the indoor unit. (See below drawing)
- Adjust the installation elevation if necessary.
- Remove the level gauge before you attach the panel.

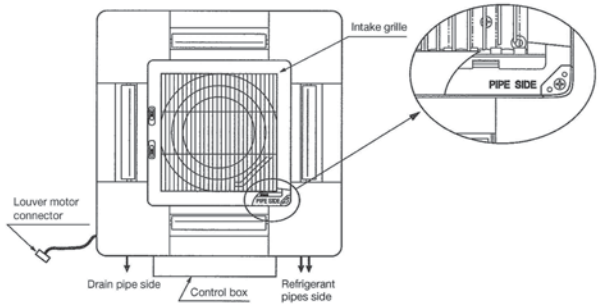

Use level gauges as reference, adjust the bottom to the face of the indoor unit.
30
Diffuser
Ceiling panel
T-bar
Level gauge (insulation)
Use level gauges as reference, adjust the bottom to the face of the indoor unit.
30
Diffuser
Level gauge (insulation)
Ceiling panel
T-bar
When the ceiling panel comes below the T bar, align the bottom of the level gauge to the lower face of the ceiling panel.

## ② Orientation of the panel and return air grille installation

1. Take note that there is an orientation to install the panel.
   - Attach the panel with the orientation shown on the below.
   - Align the "PIPE SIDE" mark (on the panel) with the refrigerant pipes on the indoor unit.
2. The intake grille can also be attached in a rotated position by 90 degrees.

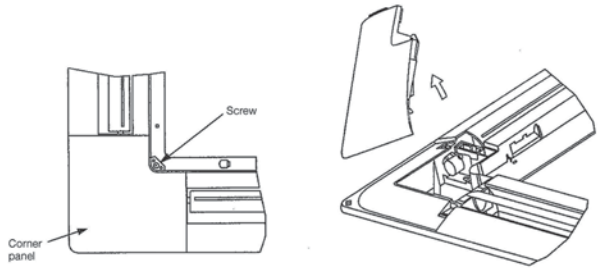
**Caution**

· In case the orientation of the panel is not correct, it will lead to air leakage and also it is not possible to connect the louver motor wiring.



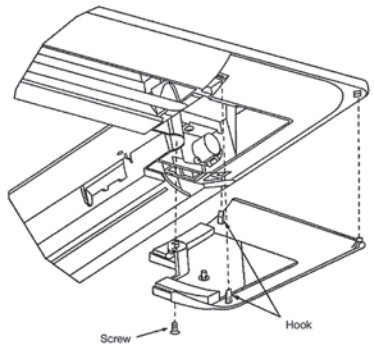

## ③ Removing a corner panel

- Unscrew the screw from the corner area, pull the corner panel toward the direction indicated by the arrow mark.




## ④ Attaching a corner panel

- First insert the part "a" of a corner panel into the part "A" of the cover panel, engage two hooks and tighten the screw.



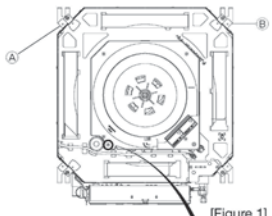

## ⑤ Panel installation

- Install the panel on the unit after completing the electrical wiring.

**Accessories**

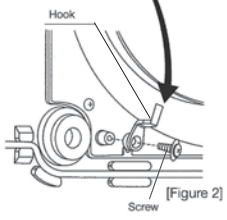
| | | | | |
|---|---|---|---|---|
| 1 | Hook | | 1 piece | For fixing temporarily |
| 2 | Chain | | 2 pieces | |
| 3 | Screw | | 4 pieces | For hoisting the panel |
| 4 | Screw | | 1 piece | For attaching a hook |
| 5 | Screw | | 2 pieces | For attaching a chain |

1. Screw in two bolts out of the four supplied with the panel by about slightly less than 5mm. (● mark Ⓐ Ⓑ) [Figure 1]



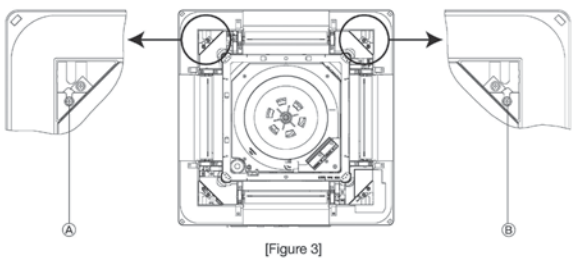

[Figure 1]

2. Attach the hook supplied with the panel to the main body with the hook fixing screw (1 screw). [Figure 2]
3. Open the intake grille.
4. Please remove the screw of a corner panel and remove a corner panel. (four places)



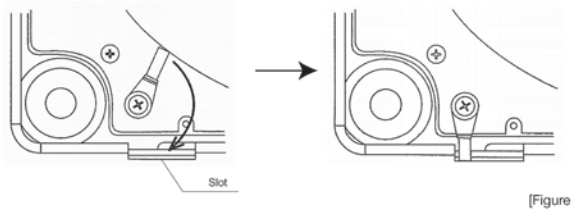

[Figure 2]

5. A panel is hooked on two bolts (● mark Ⓐ Ⓑ). [Figure 3]




[Figure 3]

6. Please rotate a hook, put in the slot on the panel, and carry out fixing the panel temporarily. [Figure 4]

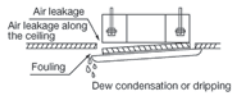



[Figure 4]

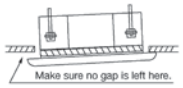
7. Tighten the two bolts used for fixing the panel temporarily and the other two.

**Caution**

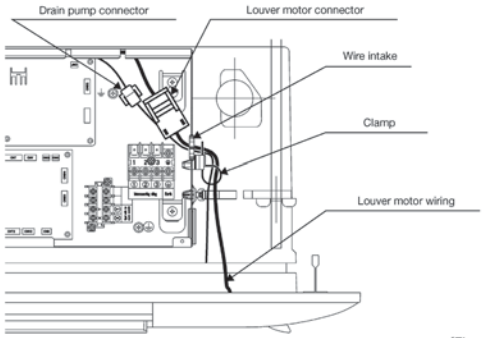
- Improperly tightened hanging bolts can cause the problems listed below, so make sure that you have tightened them securely.




- If there is a gap remaining between the ceiling and the decorative panel even after the hanging bolts are tightened, adjust the installation level of the indoor unit again.

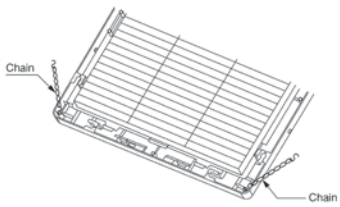



8. Please open the lid of a control box.
9. Like drain pump wiring, please band together by the clamp and put in louver motor wiring into a control box. [Figure 5]
10. Please connect a louver motor connector. [Figure 5]



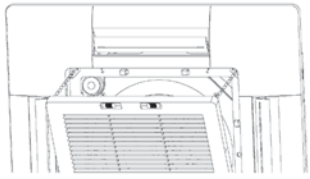

[Figure 5]

11. Attach two chains to the intake grille with two screws. [Figure 6]




[Figure 6]

12. Replace the corner panels. Please also close a chain with a screw together then. [Figure 7]
13. Close the intake grill.



[Figure 7]

**Caution**

Make sure there is no stress given on the panel when adjusting the height of the indoor unit to avoid unexpected distortion. It may cause the distortion of panel or failing to close the air return grille.

## ⑦ How to set the airflow direction

It is possible to change the movable range of the louver on the air outlet from the wired remote controller. Once the top and bottom position is set, the louver will swing within the range between the top and the bottom when swing operation is chosen. It is also possible to apply different setting to each louver.

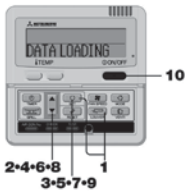
**1 Stop the air conditioner and press SET button and LOUVER button simultaneously for three seconds or more.**

The following is displayed if the number of the indoor units connected to the remote controller is one. Go to step **4**.

"DATA LOADING "
↓
"No.1 ▲"

The following is displayed if the number of the indoor units connected to the remote controller are more than one

"SELECT I/U"
↓
"I/U000 ▲"




**2 Press ▲ or ▼ button. (selection of indoor unit)**

Select the indoor unit of which the louver is set.

**[EXAMPLE]**

"I/U000 ▲"⇔"I/U001 ↕"⇔"I/U002 ↕"⇔
"I/U003 ↕"

**3 Press SET button. (determination of indoor unit)**

Selected indoor unit is fixed.

**[EXAMPLE]**

"I/U001 " (displayed for two seconds)
↓
"DATA LOADING "
↓
"No.1 ▲"

**NOTICE**

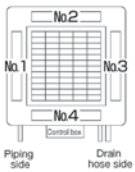
- In case the louver No to be set is uncertain, set any louver temporarily.
The louver will swing once when the setting is completed and it is possible to confirm the louver No and the position.
After that, choose the correct louver No and set the top and bottom position.

**4 Press ▲ or ▼ button. (selection of louver No.)**

Select the louver No. to be set according to the right figure.

**[EXAMPLE]**

"No.1 ▲"⇔"No.2 ↕"⇔"No.3 ↕"⇔
"No.4 ▼"




Louver No.

**Press SET button. (Determination of louver No.)**

The louver No. to be set is confirmed and the display shows the upper limit of the movable range.

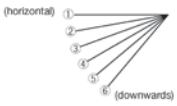
**[EXAMPLE] If No. louver is selected**

"No.1 UPPER2 ↕" ← current upper limit position

**6 Press ▲ or ▼ button. (selection of upper limit position)**

Select the upper limit of louver movable range.
"position 1" is the most horizontal, and "position 6" is the most downward.
"position --" is to return to the factory setting. If you need to change the setting to the default setting, use "position --".

"No.1 UPPER1 ▼" (the most horizontal)
⇔"No.1 UPPER2 ↕"
⇔"No.1 UPPER3 ↕"
⇔"No.1 UPPER4 ↕"
⇔"No.1 UPPER5 ↕"
⇔"No.1 UPPER6 ↕" (the most downwards)
⇔"No.1 UPPER-- ▲" (return to the default setting)




the position of the louver

**Press SET button. ( i in of the upper limit position)**

The upper limit position is fixed and the setting position is displayed for two seconds. Then proceed to lower limit position selection display.

**[EXAMPLE]**

No.1 UPPER2 (displayed for two seconds)
↓
No.1 LOWER5 ↕ (shows current setting)

**8 Press ▲ or ▼ button. (Selection of lower limit position)**

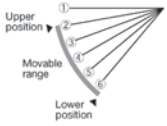
Select the lower limit position of louver.
"position 1" is the most horizontal, and "position 6" is the most downwards.
"position --" is to return to the factory setting. If you need to change the setting to the default setting, use "position --".

No.1 LOWER1 ▼ (the most horizontal)
No.1 LOWER2 ↕
No.1 LOWER3 ↕
No.1 LOWER4 ↕
No.1 LOWER5 ↕
No.1 LOWER6 ↕ (the most downwards)
No.1 LOWER-- ▲ (return to the default setting)

**Press SET button. ( i in of the lower limit position)**

Upper limit position and lower limit position are fixed, and the set positions are displayed for two seconds, then setting is completed.

- After the setting is completed, the louver which was set moves from the original position to the lower limit position, and goes back to the original position again. (This operation is not performed if the indoor unit and or indoor unit fan is in operation.)




**[EXAMPLE]**

No.1 U2 L6 (displayed for two seconds)
↓
SET COMPLETE
↓
No.1 ▲

**10 Press ON/OFF button.**

Louver adjusting mode ends and returns to the original display.

**Caution**

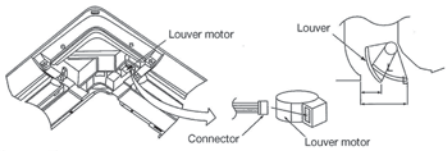
If the upper limit position number and the lower limit position number are set to the same position, the louver is fixed at that position auto swing does not function.

**ATTENTION**

If you press RESET button during settings, the display will return to previous display.
If you press ON/OFF button during settings, the mode will be ended and return to original display, and the settings that have not been completed will become invalid.

When plural remote controllers are connected, louver setting operation cannot be set by slave remote controller.

If it is necessary to fix the louver position manually, follow the procedure mentioned below.
1. Shut off the main power switch.
2. Unplug the connector of the louver motor which you want to fix the position.
Make sure to insulate unplugged connectors electrically with a vinyl tape.
3. Adjust the louver position slowly by hand so as to be within the applicable range mentioned below table.




<Range of louver setting>

| Vertical airflow direction | Horizontal 23° | Downwards 50° |
|---|---|---|
| Dimension L (mm) | 40 | 24 |

※It can be set between 24~40mm freely.

**Caution**

- Any automatic control or operation from the remote controller will be disabled on the louver whose position is fixed in the above way.
- Do not set a louver beyond the specified range. Failure to observe this instruction may result in dripping, dew condensation, the fouling of the ceiling and the malfunctioning of the unit.

PJF012D016

## (2) Ceiling cassette-4way type (FDT)

This manual is for the installation of an indoor unit.
For electrical wiring work (Indoor), refer to the electrical wiring work installation manual. For remote controller installation, refer to the installation manual attached to a remote controller. For wireless kit installation, refer to the installation manual attached to a wireless kit. For electrical wiring work (Outdoor) and refrigerant pipe work installation for outdoor unit, refer to the installation manual attached to an outdoor unit.
This unit must always be used with the panel.

### SAFETY PRECAUTIONS

- Read the "SAFETY PRECAUTIONS" carefully first of all and then strictly follow it during the installation work in order to protect yourself.
- The precautionary items mentioned below are distinguished into two levels, ⚠WARNING and ⚠CAUTION .
  ⚠WARNING : Wrong installation would cause serious consequences such as injuries or death.
  ⚠CAUTION : Wrong installation might cause serious consequences depending on circumstances.
  Both mentions the important items to protect your health and safety so strictly follow them by any means.
- The meanings of "Marks" used here are as shown on the right:
  ⃠ Never do it under any circumstances. ❗ Always do it according to the instruction.
- After completing the installation, do commissioning to confirm there are no abnormalities, and explain to the customers about "SAFETY PRECAUTIONS", correct operation method and maintenance method (air filter cleaning, operation method and temperature setting method) with user's manual of this unit.
  Ask your customers to keep this installation manual together with the user's manual. Also, ask them to hand over the user's manual to the new user when the owner is changed.

### ⚠WARNING

- **Installation should be performed by the specialist.**
  If you install the unit by yourself, it may lead to serious trouble such as water leakage, electric shock, fire, and injury due to overturn of the unit.
- **Install the system correctly according to these installation manuals.**
  Improper installation may cause explosion, injury, water leakage, electric shock, and fire.
- **Check the density refered by the foumula (accordance with ISO5149).**
  If the density exceeds the limit density, please consult the dealer and installate the ventilation system.
- **Use the genuine accessories and the specified parts for installation.**
  If parts unspecified by our company are used it could cause water leakage, electric shock, fire, and injury due to overturn of the unit.
- **Ventilate the working area well in case the refrigerant leaks during installation.**
  If the refrigerant contacts the fire, toxic gas is produced.
- **Install the unit in a location that can hold heavy weight.**
  Improper installation may cause the unit to fall leading to accidents.
- **Install the unit properly in order to be able to withstand strong winds such as typhoons, and earthquakes.**
  Improper installation may cause the unit to fall leading to accidents.
- **Do not mix air in to the cooling cycle on installation or removal of the air conditioner.**
  If air is mixed in, the pressure in the cooling cycle will rise abnormally and may cause explosion and injuries.
- **Be sure to have the electrical wiring work done by qualified electrical installer, and use exclusive circuit.**
  Power source with insufficient capacity and improper work can cause electric shock and fire.
- **Use specified wire for electrical wiring, fasten the wiring to the terminal securely, and hold the cable securely in order not to apply unexpected stress on the terminal.**
  Loose connections or hold could result in abnormal heat generation or fire.
- **Arrange the electrical wires in the control box properly to prevent them from rising. Fit the lid of the services panel property.**
  Improper fitting may cause abnormal heat and fire.
- **Check for refrigerant gas leakage after installation is completed.**
  If the refrigerant gas leaks into the house and comes in contact with a fan heater, a stove, or an oven, toxic gas is produced.
- **Use the specified pipe, flare nut, and tools for R410A.**
  Using existing parts (R22) could cause the unit failure and serious accident due to explosion of the cooling cycle.
- **Tighten the flare nut according to the specified method by with torque wrench.**
  If the flare nut were tightened with excess torque, it could cause burst and refrigerant leakage after a long period.
- **Do not put the drainage pipe directly into drainage channels where poisonous gases such as sulfide gas can occur.**
  Poisonous gases will flow into the room through drainage pipe and seriously affect the user's health and safety. This can also cause the corrosion of the indoor unit and a resultant unit failure or refrigerant leak.
- **Connect the pipes for refrigeration circuit securely in installation work before compressor is operated.**
  If the compressor is operated when the service valve is open without connecting the pipe, it could cause explosion and injuries due to abnormal high pressure in the system.
- **Stop the compressor before removing the pipe after shutting the service valve on pump down work.**
  If the pipe is removed when the compressor is in operation with the service valve open, air would be mixed in the refrigeration circuit and it could cause explosion and injuries due to abnormal high pressure in the cooling cycle.
- **Only use prescribed optional parts. The installation must be carried out by the qualified installer.**
  If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- **Do not repair by yourself. And consult with the dealer about repair.**
  Improper repair may cause water leakage, electric shock or fire.
- **Consult the dealer or a specialist about removal of the air conditioner.**
  Improper installation may cause water leakage, electric shock or fire.
- **Turn off the power source during servicing or inspection work.**
  If the power is supplied during servicing or inspection work, it could cause electric shock and injury by the operating fan.
- **Do not run the unit when the panel or protection guard are taken off.**
  Touching the rotating equipment, hot surface, or high voltage section could cause an injury to be caught in the machine, to get burned, or electric shock.
- **Shut off the power before electrical wiring work.**
  It could cause electric shock, unit failure and improper running.

### ⚠ CAUTION

- **Perform earth wiring surely.**
  Do not connect the earth wiring to the gas pipe, water pipe, lightning rod and telephone earth wiring. Improper earth could cause unit failure and electric shock due to a short circuit.
- **Earth leakage breaker must be installed.**
  If the earth leakage breaker is not installed, it can cause electric shocks.
- **Use the circuit breaker of correct capacity. Circuit breaker should be the one that disconnect all poles under over current.**
  Using the incorrect one could cause the system failure and fire.
- **Do not use any materials other than a fuse of correct capacity where a fuse should be used.**
  Connecting the circuit by wire or copper wire could cause unit failure and fire.
- **Do not install the indoor unit near the location where there is possibility of flammable gas leakages.**
  If the gas leaks and gathers around the unit, it could cause fire.
- **Do not install and use the unit where corrosive gas (such as sulfurous acid gas etc.) or flammable gas (such as thinner, petroleum etc.) may be generated or accumulated, or volatile flammable substances are handled.**
  It could cause the corrosion of heat exchanger, breakage of plastic parts etc. And inflammable gas could cause fire.
- **Secure a space for installation, inspection and maintenance specified in the manual.**
  Insufficient space can result in accident such as personal injury due to falling from the installation place.
- **Do not use the indoor unit at the place where water splashes such as laundry.**
  Indoor unit is not waterproof. It could cause electric shock and fire.
- **Do not use the indoor unit for a special purpose such as food storage, cooling for precision instrument, preservation of animals, plants, and a work of art.**
  It could cause the damage of the items.
- **Do not install nor use the system near equipments which generate electromagnetic wave or high harmonics.**
  Equipments like inverter equipment, private power generator, high-frequency medical equipment, or telecommunication equipment might influence the air conditioner and cause a malfunction and breakdown. Or the air conditioner might influence medical equipments or telecommunication equipments, and obstruct their medical activity or cause jamming.
- **Do not install the remote controller at the direct sunlight.**
  It could cause breakdown or deformation of the remote controller.
- **Do not install the indoor unit at the place listed below.**
  - Places where flammable gas could leak.
  - Places where carbon fiber, metal powder or any powder is floated.
  - Place where the substances which affect the air conditioner are generated such as sulfide gas, chloride gas, acid, alkali or ammonic atmospheres.
  - Places exposed to oil mist or steam directly.
  - On vehicles and ships
  - Places where machinery which generates high harmonics is used.
  - Places where cosmetics or special sprays are frequently used.
  - Highly salted area such as beach.
  - Heavy snow area
  - Places where the system is affected by smoke from a chimney.
  - Altitude over 1000m
- **Do not install the indoor unit in the locations listed below (Be sure to install the indoor unit according to the installation manual for each model because each indoor unit has each limitation)**
  - Locations with any obstacles which can prevent inlet and outlet air of the unit
  - Locations where vibration can be amplified due to insufficient strength of structure.
  - Locations where the infrared receiver is exposed to the direct sunlight or the strong light beam. (in case of the infrared specification unit)
  - Locations where an equipment affected by high harmonics is placed. (TV set or radio receiver is placed within 5m)
  - Locations where drainage cannot run off safely.

  It can affect performance or function and etc..
- **Do not put any valuables which will break down by getting wet under the air conditioner.**
  Condensation could drop when the relative humidity is higher than 80% or drain pipe is clogged, and it damages user's belongings.
- **Do not use the base frame for the outdoor unit which is corroded or damaged after a long period of use.**
  It could cause the unit falling down and injury.
- **Pay attention not to damage the drain pan by weld sputter when brazing work is done near the unit.**
  If sputter entered into the unit during brazing work, it could cause damage (pinhole) of drain pan and leakage of water. To avoid damaging, keep the indoor unit packed or cover the indoor unit.
- **Install the drain pipe to drain the water surely according to the installation manual.**
  Improper connection of the drain pipe may cause dropping water into room and damaging user's belongings.
- **Do not share the drain pipe for indoor unit and GHP (Gas Heat Pump system) outdoor unit.**
  Toxic exhaust gas would flow into room and it might cause serious damage (some poisoning or deficiency of oxygen) to user's health and safety.
- **Be sure to perform air tightness test by pressurizing with nitrogen gas after completed refrigerant piping work.**
  If the density of refrigerant exceeds the limit in the event of refrigerant leakage in the small room, lack of oxygen can occur, which can cause serious accidents.
- **For drain pipe installation, be sure to make descending slope of greater than 1/100, not to make traps, and not to make air-bleeding.**
  Check if the drainage is correctly done during commissioning and ensure the space for inspection and maintenance.
- **Ensure the insulation on the pipes for refrigeration circuit so as not to condense water.**
  Incomplete insulation could cause condensation and it would wet ceiling, floor, and any other valuables.
- **Do not install the outdoor unit where is likely to be a nest for insects and small animals.**
  Insects and small animals could come into the electronic components and cause breakdown and fire. Instruct the user to keep the surroundings clean.
- **Pay extra attention, carrying the unit by hand.**
  Carry the unit with 2 people if it is heavier than 20kg. Do not use the plastic straps but the grabbing place, moving the unit by hand. Use protective gloves in order to avoid injury by the aluminum fin.
- **Make sure to dispose of the packaging material.**
  Leaving the materials may cause injury as metals like nail and woods are used in the package.
- **Do not operate the system without the air filter.**
  It may cause the breakdown of the system due to clogging of the heat exchanger.
- **Do not touch any button with wet hands.**
  It could cause electric shock.
- **Do not touch the refrigerant piping with bare hands when in operation.**
  The pipe during operation would become very hot or cold according to the operating condition, and it could cause a burn or frostbite.
- **Do not clean up the air conditioner with water.**
  It could cause electric shock.
- **Do not turn off the power source immediately after stopping the operation.**
  Be sure to wait for more than 5 minutes. Otherwise it could cause water leakage or breakdown.
- **Do not control the operation with the circuit breaker.**
  It could cause fire or water leakage. In addition, the fan may start operation unexpectedly and it may cause injury.

## ①Before installation

●Install correctly according to the installation manual.

●Confirm the following points:

○Unit type/Power supply specification ○Pipes/Wires/Small parts ○Accessory items

Accessory item

| For unit hanging | | For refrigerant pipe | | | For drain pipe | | | |
|---|---|---|---|---|---|---|---|---|
| Flat washer (M10) | Level gauge | Pipe cover(big) | Pipe cover (small) | Strap | Pipe cover(big) | Pipe cover(small) | Drain hose | Hose clamp |
| | | | | | | | | |
| 8 | 1 | 1 | 1 | 4 | 1 | 1 | 1 | 1 |
| For unit hanging | For unit hanging and adjustment | For heat insulation of gas pipe | For heat insulation of liquid tube | For pipe cover fixing | For heat insulation of drain socket | For heat insulation of drain socket | For drain pipe connecting | For drain hose mounting |

## ②Selection of installation location for the indoor unit

① Select the suitable areas to install the unit under approval of the user.

- Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 28°C and relative humidity is lower than 80%.

  This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
  If there is a possibility to use it under such a condition, attach additional insulation of 10 to 20mm thick for entire surface of indoor unit, refrigeration pipe and drain pipe.
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.
- Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
  (A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

②Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

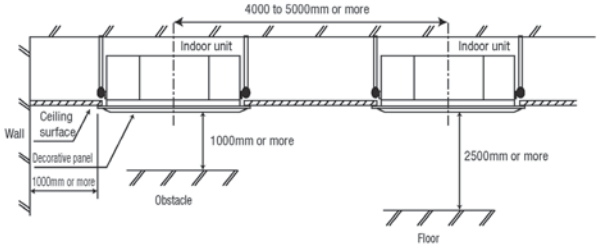
③If there are 2 units of wireless type, keep them away for more than 6m to avoid malfunction due to cross communication.

④When plural indoor units are installed nearby, keep them away for more than 4 to 5m.

Space for installation and service

●When it is not possible to keep enough space between indoor unit and wall or between indoor units, close the air supply port where it is not possible to keep space and confirm there is no short circuit of airflow.

●Install the indoor unit at a height of more than 2.5m above the floor.




Set blow-out pattern

●Select the most proper number of blow-out air supply port direction from 4 way, 3 way or 2 way according to the shape of the room and installation position. (1 way is not available.)

●If it is necessary to change the number of air supply port, prepare the covering materials. (sold as accessory)

●Instruct the user not to use low fan speed when 2way or 3way air supply is used.

●Do not use 2way air supply port under high temperature and humidity environment. (Otherwise it could cause condensation and leakage of water.)

●It is possible to set the airflow direction port by port independently. Refer to tne user's manual for details.

## ③Preparation before installation

●If suspension bolt becomes longer, do reinforcement of earthquake resistant.

○For grid ceiling

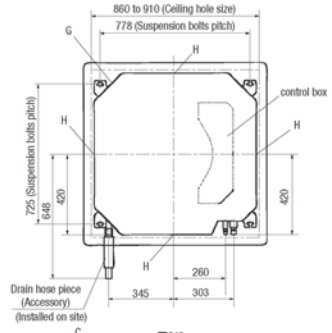
When suspension bolt length is over 500mm, or the gap between the ceiling and roof is over 700mm, apply earthquake resistant brace to the bolt.

○In case the unit is hanged directly from the slab and is installed on the ceiling plane which has enough strength.

When suspension bolt length is over 1000mm, apply the earthquake resistant brace to the bolt.

●Prepare four (4) sets of suspension bolt, nut and spring washer (M10 or M8) on site.

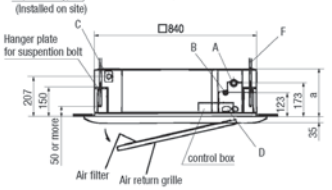
Ceiling opening, Suspension bolts pitch, Pipe position

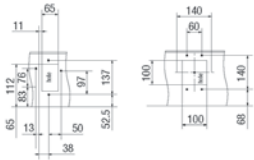



(mm)

| Series | Type | a |
|---|---|---|
| Single Split (PAC) series | 40 to 71 type | 246 |
| | 100 to 140 type | 298 |
| VRF (KX) series | 28 to 71 type | 246 |
| | 90 to 160 type | 298 |

| Symbol | |
|---|---|
| A | Gas piping |
| B | Liquid piping |
| C | Drain piping |
| D | Hole for wiring |
| F | Suspension bolts |
| G | Outside air opening for ducting |
| H | Air outlet opening for ducting |



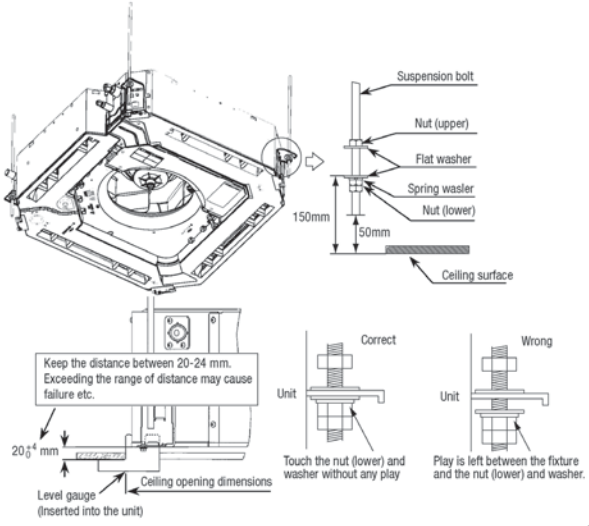




G H

## ④Installation of indoor unit

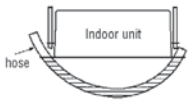
Work procedure

1. Prepare a ceiling hole with the size of from 860mm × 860mm to 910mm × 910mm referring to the template attached in the package.
2. Arrange the suspension bolt at the right position (725mm×778mm).
3. Make sure to use four suspension bolts and fix them so as to be able to hold 500N load.
4. Ensure that the lower end of the suspension bolt should be 50mm above the ceiling plane. Temporarily put the four lower nuts 150mm above the ceiling plane and the upper nuts on distant place from the lower nuts in order not to obstruct hanging the indoor unit or adjust the indoor unit position, and then hang the indoor unit.
5. Adjust the indoor unit position after hanging it by inserting the level gauge attached on the package into the air supply port and checking if the gap between the ceiling plane and the indoor unit is appropriate. In order to adjust the indoor unit position, adjust the lower nuts while the upper nuts are put on distant place. Confirm there is no backlash between the hanger plate for suspension bolt and the lower nut and washer.



## ④Installation of indoor unit (continued)

6. Make sure to install the indoor unit horizontally. Confirm the levelness of the indoor unit with a level gauge or transparent hose filled with water. Keep the height difference at both ends of the indoor unit within 3mm.
7. Tighten four upper nuts and fix the unit after height and levelness adjustment.




Caution

- Do not adjust the height by adjusting upper nuts. It will cause unexpected stress on the indoor unit and it will lead to deformation of the unit, failure of attaching a panel, and generating noise from the fan.
- Make sure to install the indoor unit horizontally and set the gap between the unit underside and the ceiling plane properly. Improper installation may cause air leakage, dew condensation, water leakage and noise.
- Even after decorative panel attached, still the unit height can be adjusted finely. Refer to the installation manual for decorative panel for details.
- Make sure there is no gap between decoration panel and ceiling surface, and between decoration panel and the indoor unit. The gap may cause air leakage, dew condensation and water leakage.
- In case decorative panel is not installed at the same time, or ceiling material is installed after the unit installed, put the cardboard template for installation attached on the package (packing material of cardboard box) on the bottom of the unit in order to avoid dust coming into the indoor unit.

## ⑤Refrigerant pipe

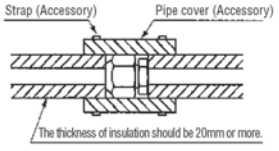
Caution

- Use the new refrigerant pipe.
  When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
  - Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
  - Do not use thin-walled pipes.
- Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
  In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.
- Do not use any refrigerant other than R410A.
  Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.
- Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.
- Use special tools for R410 refrigerant.

Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit.
   ※ Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   (Gas may come out at this time, but it is not abnormal.)
   - Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
   ※Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
   ※Do a flare connection as follows:
   - Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   - When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
   - Make sure to insulate both gas pipes and liquid pipes completely.
     ※Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit.
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

| Pipe diameter | Tightening torque N·m |
|---|---|
| ϕ 6.35 | 14 to 18 |
| ϕ 9.52 | 34 to 42 |
| ϕ 12.7 | 49 to 61 |
| ϕ 15.88 | 68 to 82 |
| ϕ 19.05 | 100 to 120 |



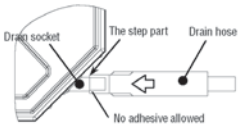

## ⑥Drain pipe

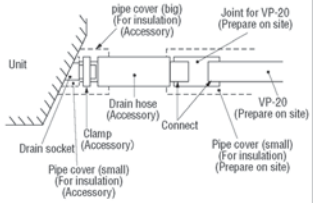
Caution

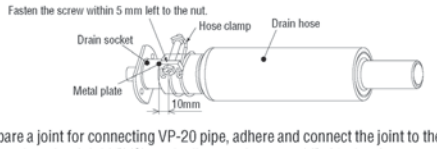
- Install the drain pipe according to the installation manual in order to drain properly.
  Imperfection in draining may cause flood indoors and wetting the household goods, etc.
- Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.
- Connect the pipe securely to avoid water leakage from the joint.
- Insulate the pipe properly to avoid condensation drop.
- Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.
- Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

Work procedure

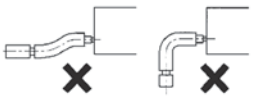
1. Make sure to insert the drain hose (the end mode of soft PVC) to the end of the step part of drain socket.
   Attach the hose clamp to the drain hose around 10mm from the end, and fasten the screw within 5mm left to the nut.
   - Do not apply adhesives on this end.



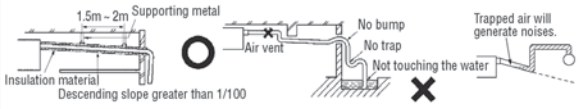



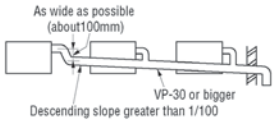

2. Prepare a joint for connecting VP-20 pipe, adhere and connect the joint to the drain hose (the end made of rigid PVC), and adhere and connect VP-20 pipe (prepare on site).
   ※As for drain pipe, apply VP-20 made of rigid PVC which is on the market.
   - Make sure that the adhesive will not get into the supplied drain hose.
     It may cause the flexible part broken after the adhesive is dried up and gets rigid.
   - The flexible drain hose is intended to absorb a small difference at installation of the unit or drain pipes. Intentional bending, expanding may cause the flexible hose broken and water leakage.



3. Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway.
   - Pay attention not to give stress on the pipe on the indoor unit side, and support and fix the pipe as close place to the unit as possible when connecting the drain pipe.
   - Do nt set up air vent.



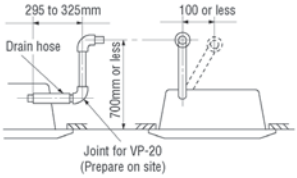

- When sharing a drain pipe for more than one unit, lay the main pipe 100mm below the drain outlet of the unit. In addition, select VP-30 or bigger size for main drain pipe.




4. Insulate the drain pipe.
   - Be sure to insulate the drain socket and rigid PVC pipe installed indoors otherwise it may cause dew condensation and water leakage.
     ※After drainage test implementation, cover the drain socket part with pipe cover (small size), then use the pipe cover (big size) to cover the pipe cover (small size), clamps and part of the drain hose, and fix and wrap it with tapes to wrap and make joint part gapless.

Drain up

- The position for drain pipe outlet can be raised up to 700mm above the ceiling. Use elbows for installation to avoid obstacles inside ceiling. If the horizontal drain pipe is too long before vertical pipe, the backflow of water will increase when the unit is stopped, and it may cause overflow of water from the drain pan on the indoor unit. In order to avoid overflow, keep the horizontal pipe length and offset of the pipe within the limit shown in the figure below.

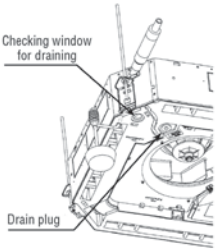


## ⑥Drain pipe (continued)

Drain test

- After installation of drain pipe, make sure that drain system work in good condition and no water leakage from joint and drain pan. Check if the motor sound of drain pump is normal or not.
- Do drain test even if installation of heating season.
- For new building cases, make sure to complete the test before hanging the ceiling.

1. Pour water of about 1000cc into the drain pan in the indoor unit by pump so as not to get the electrical component wet.
2. Make sure that water is drained out properly and there is no water leakage from any joints of the drain pipe at the test.
   Confirm that the water is properly drained out while the drain motor is operating. At the drain socket (transparent), it is possible to check if the water is drained out properly.
3. Unplug the drain plug on the indoor unit to remove remain ing water on the drain pan after the test, and re-plug it. And insulate the drain pipe properly finally.




Drain pump operation

○In case electrical wiring work finished

Drain pump can be operated by remote controller (wired).
For the operation method, refer to Operation for drain pump in the installation manual for wiring work.

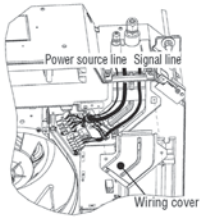
○In case electrical wiring work not finished

Drain pump will run continuously when the dip switch"SW7-1" on the indoor unit PCB is turned ON, the Connector CNB is disconnected, and then the power supply (230VAC on the terminal block ① and ②) is turned ON.
Make sure to turn OFF "SW7-1" and reconnect the Connector CNB after the test.

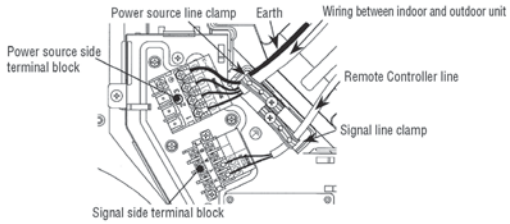
## ⑦Wiring-out position and wiring connection

- Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country.
  Be sure to use an exclusive circuit.
- Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
- Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
- Be sure to do D type earth work.
- For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

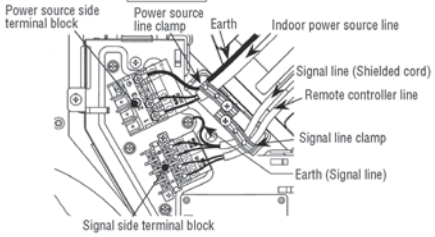
1. Remove a lid of the control box (3 screws) and the wiring cover (2 screws).
2. Hold each wiring inside the unit and fasten them to terminal block securely.
3. Fix the wiring with clamps.
4. Install the removed parts back to original place.




Single Split (PAC) series




VRF (KX) series




## ⑧Panel installation

- Attach the panel on the indoor unit after electrical wiring work.
- Refer to attached manual for panel installation for details. (See next page)

## ⑨Check list after installation

- Check the following items after all installation work completed.

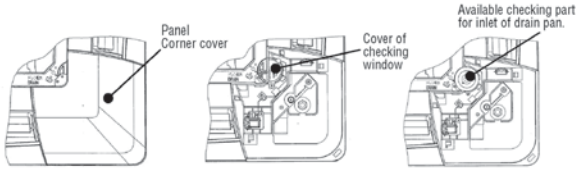
| Check if; | Expected trouble | Check |
|---|---|---|
| The indoor and outdoor units are fixed securely? | Falling, vibration, noise | |
| Inspection for leakage is done? | Insufficient capacity | |
| Insulation work is properly done? | Water leakage | |
| Water is drained properly? | Water leakage | |
| Supply voltage is same as mentioned in the model name plate? | PCB burnt out, not working at all | |
| There is mis-wiring or mis-connection of piping? | PCB burnt out, not working at all | |
| Earth wiring is connected properly? | Electric shock | |
| Cable size comply with specified size? | PCB burnt out, not working at all | |
| Any obstacle blocks airflow on air inlet and outlet? | Insufficient capacity | |

## ⑩How to check the dirt of drain pan (Maintenance)

The method of checking the dirt of drain pan

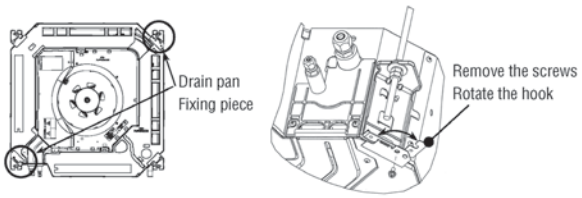
- It is possible to check the dirt for inlet of drain pan without detaching the panel.
  (Inspection is not possible when the high efficient filter and option spacer is installed.)

1. Open the air return grille and remove the panel corner cover on drain pan side.
2. Remove the cover of inspection window. (1screw)
3. Check the drain pan from the inspection window.
   If the drain pan is very dirty, remove the drain pan and clean it.
4. After checking of the dirty of drain pan, restore the cover of the inspection window securely. Improper restoration of the cover may cause dew condensation and water leakage.




Attention for removing drain pan

- The fixing components have been attached the with drain pan. Pay attention to these components during installation and removing. Take off the hanging hook after removing four screws. During the installation of drain pan, fix the drain pan firmly by using four screws after hanging it up with the fixing hook.



# PANEL INSTALLATION MANUAL

PJF012D003A A

Read this manual together with the indoor unit's installation manual.

**⚠ WARNING**

- **Fasten the wiring to the terminal securely and hold the cable securely so as not to apply unexpected stress on the terminal. Loose connection or hold will cause abnormal heat generation or fire.**
- **Make sure the power supply is turned off when electric wiring work. Otherwise, electric shock, malfunction and improper running may occur.**

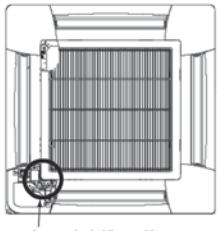
## ① Before installation

- Follow installation manual carefully, and install the panel properly.
- Check the following items.
  - ○ Accessories

Accessories

| | | | |
|---|---|---|---|
| Bolt | | 4 pieces | For panel installation |
| Strap | | 4 pieces | For avoiding the corner panel from falling |

Note: Accessories are laid in the position removing the corner panel.



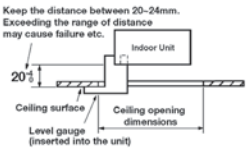
Accessories holding position

## ② Checking the indoor unit installation position

- Read this manual together with the air conditioner installation manual carefully.
- Check if the opening size for the indoor unit is correct with the level gauge supplied in the indoor unit.
- Check if the gap between the ceiling plane and the indoor unit is correct by inserting the level gauge into the air outlet port of the indoor unit. (See below drawing)
- Adjust the installation elevation if necessary.

**Caution**

If there is a height difference beyond the design limit between the installation level of the indoor unit and the ceiling plane, the panel may be subject to excessive stress during installation, it may cause distortion and damage.

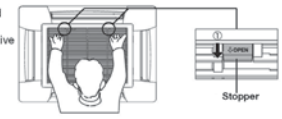

Keep the distance between 20–24mm.
Exceeding the range of distance may cause failure etc.
Indoor Unit
20
Ceiling surface
Ceiling opening dimensions
Level gauge (inserted into the unit)

- The installation level of the indoor unit can be adjusted finely from the opening provided on the corner, even after panel is attached. (Refer to ⑥ Attaching the panel for details.)

## ③ Removing the air return grille

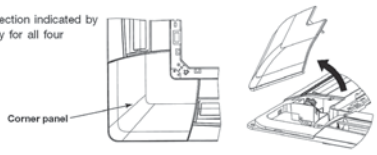
1. Hold the stoppers on the air return grille (2 places) toward OPEN direction, open the air return grille.
2. Remove the hooks of the air return grille from the decorative panel while it is in the open position.

<Removal>




## ④ Removing a corner panel

- Pull the corner panel toward the direction indicated by the arrow and remove it. (Same way for all four corner panels)



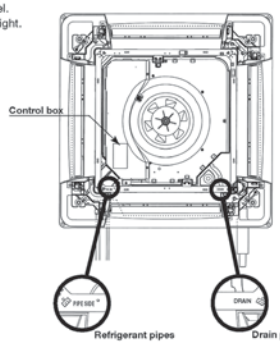

## ⑤ Orientation of the panel installation

Take note that there is an orientation to install the panel.

- Attach the panel with the orientation shown on the right.
- Align the "PIPE SIDE" mark (on the panel) with the refrigerant pipes on the indoor unit.
- Align the "DRAIN" mark (on the panel) with the drain pipe on the indoor unit.

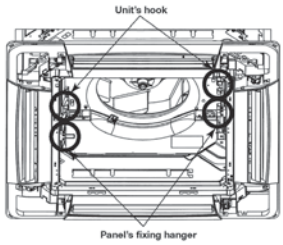
**CAUTION**

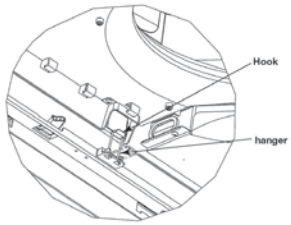
In case the orientation of the panel is not correct, it will lead to air leakage and also it is not possible to connect the louver motor wiring.




## ⑥ Attaching the panel

1. Temporary attaching
   - Lift up the hanger (2 places) on the panel for temporary support.
   - Hang the panel on the hook on the indoor unit.

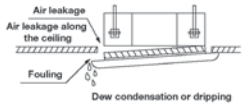


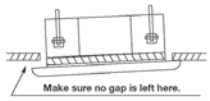

2. Fix the panel on the indoor unit
   - Fasten the panel on the indoor unit with the four bolts supplied with the panel.

**Caution**

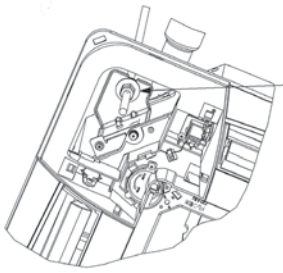
- Improperly tightened hanging bolts can cause the problems listed below, so make sure that you have tightened them securely.




- If there is a gap remaining between the ceiling and the decorative panel even after the hanging bolts are tightened, adjust the installation level of the indoor unit again.




- It is possible to adjust the installation height of the indoor unit with the panel attached as long as there is no influence on the drain pipe inclination and/or the indoor unit levelness.



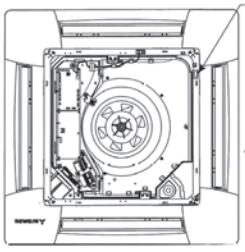
To adjust finely, please turn a nut fastening the indoor unit using a spanner or similar tool from the opening on the corner.

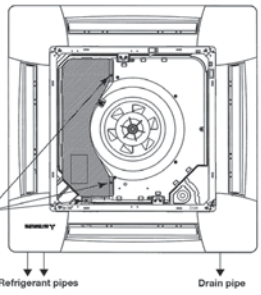
**Caution**

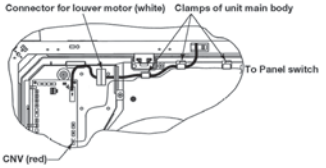
Make sure there is no stress given on the panel when adjusting the height of the indoor unit to avoid unexpected distortion. It may cause the distortion of panel or failing to close the air return grille.

## ⑦ Electrical wiring

1. After removing three screws of control box, detach the cover of control box (the hatched part).
2. Connect the connector for louver motor (white 20P).
   - Hold the wiring by using the clamps of the indoor unit.
   - Hold the connector inside the control box.
3. Connect the connector for panel switch.
   - Hold the wiring by using the clamps of the indoor unit.
   - Connect CNV (red) inside the control box.



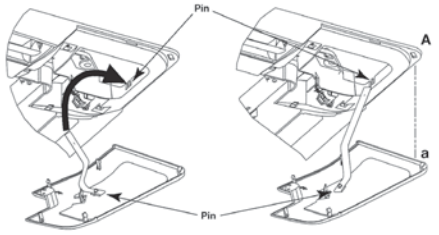




**CAUTION**

- If the air return grill is opened, the panel switch is turned off so that the air-conditioner cannot be operated any more.
- To start the air conditioner, close the air return grill.

## ⑧ Attaching a corner panel

1. To avoid unexpected falling of the corner panel, put the strap onto the corner panel's pin with turning the strap up.
2. Then hang the strap of a corner panel onto the decorative panel's pin.
3. First insert the part "a" of a corner panel into the part "A" of the decorative panel, and then engage four hooks.




## ⑨ How to set the airflow direction

It is possible to change the movable range of the louver on the air outlet from the wired remote controller. Once the top and bottom position is set, the louver will swing within the range between the top and the bottom when swing operation is chosen. It is also possible to apply different setting to each louver.

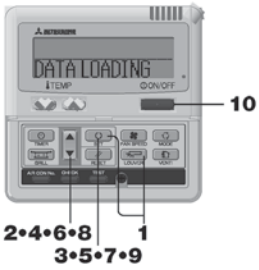
**1 Stop the air conditioner and press SET button and LOUVER button simultaneously for three seconds or more.**

The following is displayed if the number of the indoor units connected to the remote controller is one. Go to step **4**.

" DATA LOADING "
↓
" No.1 ▲"

The following is displayed if the number of the indoor units connected to the remote controller are more than one

" SELECT I/U "
↓
" I/U000 ▲"




**2 Press ▲ or ▼ button.(selection of indoor unit)**

Select the indoor unit of which the louver is set.

[EXAMPLE]
" I/U000 ▲"⇔" I/U001 ⇕"⇔" I/U002 ⇕"⇔
" I/U003 ⇕"

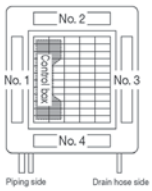
**3 Press SET button. (determination of indoor unit)**

Selected indoor unit is fixed.

[EXAMPLE]
" I/U001 " (displayed for two seconds)
↓
" DATA LOADING "
↓
" No.1 ▲"

**NOTICE**

- For FDT type, in case the louver No to be set is uncertain, set any louver temporarily. The louver will swing once when the setting is completed and it is possible to confirm the louver No and the position. After that, choose the correct louver No and set the top and bottom position.




Louver No.

**4 Press ▲ or ▼ button. (selection of louver No.)**

Select the louver No. to be set according to the right figure.

[EXAMPLE]
No.1 ▲"⇔ No.2 ⇕"⇔ No.3 ⇕"⇔
No.4 ▼"

**5 Press SET button. (Determination of louver No.)**

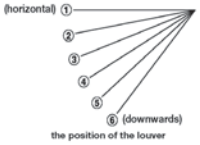
The louver No. to be set is confirmed and the display shows the upper limit of the movable range.

[EXAMPLE] **If No.1 louver is selected,**
"No.1 UPPER2 ⇕" ← current upper limit position

**6 Press ▲ or ▼ button. (selection of upper limit position)**

Select the upper limit of louver movable range.
"position1" is the most horizontal, and "position 6" is the most downward.
"position --" is to return to the factory setting. If you need to change the setting to the default setting, use "position --".

"No.1 UPPER1 ▼" (the most horizotal)
⇔ "No.1 UPPER2 ⇕"
⇔ "No.1 UPPER3 ⇕"
⇔ "No.1 UPPER4 ⇕"
⇔ "No.1 UPPER5 ⇕"
⇔ "No.1 UPPER6 ⇕" (the most downwards)
⇔ "No.1 UPPER-- ▲" (return to the default setting)




the position of the louver

**7 Press SET button (Fixing of the upper limit position)**

The upper limit position is fixed and the setting position is displayed for two seconds. Then proceed to lower limit position selection display.

[EXAMPLE]
No.1 UPPER2 (displayed for two seconds)
↓
No.1 LOWER5 ⇕ (shows current setting)

**8 Press▲ or ▼ button (Selection of lower limit position)**

Select the lower limit position of louver.
"position 1" is the most horizontal, and "position 6 " is the most downwards.
"position --" is to return to the factory setting. If you need to change the setting to the default setting, use "position --".

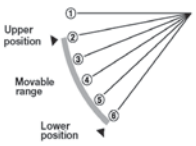
No.1 LOWER1 ▼ (the most horizontal)
No.1 LOWER2 ⇕
No.1 LOWER3 ⇕
No.1 LOWER4 ⇕
No.1 LOWER5 ⇕
No.1 LOWER6 ⇕ (the most horizontal)
No.1 LOWER-- ▲ (return to the default setting)

**9 Press SET button (Fixing of the lower limit position)**

Upper limit position and lower limit position are fixed, and the set positions are displayed for two seconds, then setting is completed.

- After the setting is completed, the louver which was set moves from the original position to the lower limit position, and goes back to the original position again. (This operation is not performed if the indoor unit and/or indoor unit fan is in operation.)

[Example]
No.1 U2 L6 (displayed for two seconds)
SET COMPLETE
No.1 ▲




**10 Press ⏻ON/OFF button.**

Louver adjusting mode ends and returns to the original display.

**Caution**

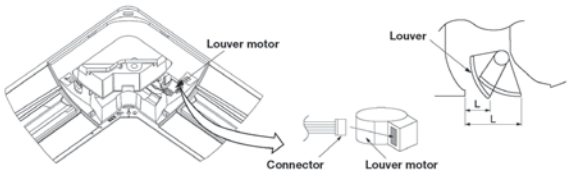
If the upper limit position number and the lower limit position number are set to the same position, the louver is fixed at that position auto swing does not funtion.

**ATTENTION**

If you press RESET button during settings, the display will return to previous display. If you press ⏻ON/OFF button during settings, the mode will be ended and return to original display, and the settings that have not been completed will become invalid.

When plural remote controllers are connected, louver setting operation cannot be set by slave remote controller.

If it is necessary to fix the louver position manually, follow the procedure mentioned below.
1. Shut off the main power switch.
2. Unplug the connector of the louver motor which you want to fix the position. Make sure to insulate unplugged connectors electrically with a vinyl tape.
3. Adjust the louver position slowly by hand so as to be within the applicable range mentioned below table.




<Range of louver setting>

| Vertical airflow direction | Horizontal 0° | Downwards 45° |
|---|---|---|
| Dimension L (mm) | 43 | 26 |

※It can be set between 26~43mm freely.

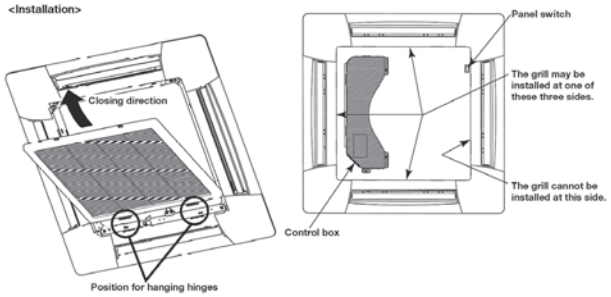
**Caution**

- Any automatic control or operation from the remote controller will be disabled on the louver whose position is fixed in the above way.
- Do not set a louver beyond the specified range. Failure to observe this instruction may result in dripping, dew condensation, the fouling of the ceiling and the malfunctioning of the unit.

## ⑩ Attaching the air return grille

To attach the air return grille, follow the procedure described in ⑦ Removing the air return grille in the reverse order.
1. Hang the hooks of the air return grille in the hole of the panel. (The hooks of the grille can be hanged in three side of the panel as following.)
2. After the grille is hanged, close the grille while the stoppers on the grille (2 places) are kept pressed to "OPEN" direction. When the grille comes to the original position, release the stoppers to hold the grille. Make sure to hear the sound of "CLICK" in both stoppers.

<Installation>


Closing direction
Position for hanging hinges
Panel switch
The grill may be installed at one of these three sides.
The grill cannot be installed at this side.
Control box

**Caution**

- Attaching the air return grille from the hinge side.
- Be careful in air return grille attaching, unstable attaching may cause grille falling.
- Repair or replace the distorted, broken stopper at once, or the grille falling may occur.

PFA012D621

### (3) Ceiling suspended type (FDEN)

This manual is for the installation of an indoor unit.
For electrical wiring work (Indoor), refer to the electrical wiring work installation manual. For remote controller installation, refer to the installation manual attached to a remote controller. For wireless kit installation, refer to the installation manual attached to a wireless kit. For electrical wiring work (Outdoor) and refrigerant pipe work installation for outdoor unit, refer to the installation manual attached to an outdoor unit.

## SAFETY PRECAUTIONS

- Read the "SAFETY PRECAUTIONS" carefully first of all and then strictly follow it during the installation work in order to protect yourself.
- The precautionary items mentioned below are distinguished into two levels, ⚠WARNING and ⚠CAUTION .
  ⚠WARNING : Wrong installation would cause serious consequences such as injuries or death.
  ⚠CAUTION : Wrong installation might cause serious consequences depending on circumstances.
  Both mentions the important items to protect your health and safety so strictly follow them by any means.
- The meanings of "Marks" used here are as shown as follows:
  ⃠ Never do it under any circumstances. ❗ Always do it according to the instruction.
- After completing the installation, do commissioning to confirm there are no abnormalities, and explain to the customers about "SAFETY PRECAUTIONS", correct operation method and maintenance method (air filter cleaning, operation method and temperature setting method) with user's manual of this unit.
  Ask your customers to keep this installation manual together with the user's manual. Also, ask them to hand over the user's manual to the new user when the owner is changed.

## ⚠WARNING

- **Installation should be performed by the specialist.**
  If you install the unit by yourself, it may lead to serious trouble such as water leakage, electric shock, fire, and injury due to overturn of the unit.
- **Install the system correctly according to these installation manuals.**
  Improper installation may cause explosion, injury, water leakage, electric shock, and fire.
- **When installing in small rooms, take prevention measures not to exceed the density limit of refrigerant in the event of leakage, referred by the formula (accordance with ISO5149).**
  If the density of refrigerant exceeds the limit, please consult the dealer and install the ventilation system, otherwise lack of oxygen can occur, which can cause serious accidents.
- **Use the genuine accessories and the specified parts for installation.**
  If parts unspecified by our company are used it could cause water leakage, electric shock, fire, and injury due to overturn of the unit.
- **Ventilate the working area well in case the refrigerant leaks during installation.**
  If the refrigerant contacts the fire, toxic gas is produced.
- **Install the unit in a location that can hold heavy weight.**
  Improper installation may cause the unit to fall leading to accidents.
- **Install the unit properly in order to be able to withstand strong winds such as typhoons, and earthquakes.**
  Improper installation may cause the unit to fall leading to accidents.
- **Do not mix air in to the cooling cycle on installation or removal of the air conditioner.**
  If air is mixed in, the pressure in the cooling cycle will rise abnormally and may cause explosion and injuries.
- **Be sure to have the electrical wiring work done by qualified electrical installer, and use exclusive circuit.**
  Power source with insufficient capacity and improper work can cause electric shock and fire.
- **Use specified wire for electrical wiring, fasten the wiring to the terminal securely, and hold the cable securely in order not to apply unexpected stress on the terminal.**
  Loose connections or hold could result in abnormal heat generation or fire.
- **Arrange the electrical wires in the control box properly to prevent them from rising. Fit the lid of the services panel property.**
  Improper fitting may cause abnormal heat and fire.
- **Check for refrigerant gas leakage after installation is completed.**
  If the refrigerant gas leaks into the house and comes in contact with a fan heater, a stove, or an oven, toxic gas is produced.
- **Use the specified pipe, flare nut, and tools for R410A.**
  Using existing parts (R22) could cause the unit failure and serious accident due to explosion of the cooling cycle.
- **Tighten the flare nut according to the specified method by with torque wrench.**
  If the flare nut were tightened with excess torque, it could cause burst and refrigerant leakage after a long period.
- **Do not put the drainage pipe directly into drainage channels where poisonous gases such as sulfide gas can occur.**
  Poisonous gases will flow into the room through drainage pipe and seriously affect the user's health and safety. This can also cause the corrosion of the indoor unit and a resultant unit failure or refrigerant leak.
- **Connect the pipes for refrigeration circuit securely in installation work before compressor is operated.**
  If the compressor is operated when the service valve is open without connecting the pipe, it could cause explosion and injuries due to abnormal high pressure in the system.
- **Stop the compressor before removing the pipe after shutting the service valve on pump down work.**
  If the pipe is removed when the compressor is in operation with the service valve open, air would be mixed in the refrigeration circuit and it could cause explosion and injuries due to abnormal high pressure in the cooling cycle.
- **Only use prescribed optional parts. The installation must be carried out by the qualified installer.**
  If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- **Do not repair by yourself. And consult with the dealer about repair.**
  Improper repair may cause water leakage, electric shock or fire.
- **Consult the dealer or a specialist about removal of the air conditioner.**
  Improper installation may cause water leakage, electric shock or fire.
- **Turn off the power source during servicing or inspection work.**
  If the power is supplied during servicing or inspection work, it could cause electric shock and injury by the operating fan.
- **Do not run the unit when the panel or protection guard are taken off.**
  Touching the rotating equipment, hot surface, or high voltage section could cause an injury to be caught in the machine, to get burned, or electric shock.
- **Shut off the power before electrical wiring work.**
  It could cause electric shock, unit failure and improper running.

## ⚠ CAUTION

- **Perform earth wiring surely.**
  Do not connect the earth wiring to the gas pipe, water pipe, lightning rod and telephone earth wiring. Improper earth could cause unit failure and electric shock due to a short circuit.
- **Earth leakage breaker must be installed.**
  If the earth leakage breaker is not installed, it can cause electric shocks.
- **Use the circuit breaker of correct capacity. Circuit breaker should be the one that disconnect all poles under over current.**
  Using the incorrect one could cause the system failure and fire.
- **Do not use any materials other than a fuse of correct capacity where a fuse should be used.**
  Connecting the circuit by wire or copper wire could cause unit failure and fire.
- **Do not install the indoor unit near the location where there is possibility of flammable gas leakages.**
  If the gas leaks and gathers around the unit, it could cause fire.
- **Do not install and use the unit where corrosive gas (such as sulfurous acid gas etc.) or flammable gas (such as thinner, petroleum etc.) may be generated or accumulated, or volatile flammable substances are handled.**
  It could cause the corrosion of heat exchanger, breakage of plastic parts etc. And inflammable gas could cause fire.
- **Secure a space for installation, inspection and maintenance specified in the manual.**
  Insufficient space can result in accident such as personal injury due to falling from the installation place.
- **Do not use the indoor unit at the place where water splashes such as laundry.**
  Indoor unit is not waterproof. It could cause electric shock and fire.
- **Do not use the indoor unit for a special purpose such as food storage, cooling for precision instrument, preservation of animals, plants, and a work of art.**
  It could cause the damage of the items.
- **Do not install nor use the system near equipments which generate electromagnetic wave or high harmonics.**
  Equipments like inverter equipment, private power generator, high-frequency medical equipment, or telecommunication equipment might influence the air conditioner and cause a malfunction and breakdown. Or the air conditioner might influence medical equipments or telecommunication equipments, and obstruct their medical activity or cause jamming.
- **Do not install the remote controller at the direct sunlight.**
  It could cause breakdown or deformation of the remote controller.
- **Do not install the indoor unit at the place listed below.**
  - Places where flammable gas could leak.
  - Places where carbon fiber, metal powder or any powder is floated.
  - Place where the substances which affect the air conditioner are generated such as sulfide gas, chloride gas, acid, alkali or ammonic atmospheres.
  - Places exposed to oil mist or steam directly.
  - On vehicles and ships
  - Places where machinery which generates high harmonics is used.
  - Places where cosmetics or special sprays are frequently used.
  - Highly salted area such as beach.
  - Heavy snow area
  - Places where the system is affected by smoke from a chimney.
  - Altitude over 1000m
- **Do not install the indoor unit in the locations listed below (Be sure to install the indoor unit according to the installation manual for each model because each indoor unit has each limitation)**
  - Locations with any obstacles which can prevent inlet and outlet air of the unit
  - Locations where vibration can be amplified due to insufficient strength of structure.
  - Locations where the infrared receiver is exposed to the direct sunlight or the strong light beam. (in case of the infrared specification unit)
  - Locations where an equipment affected by high harmonics is placed. (TV set or radio receiver is placed within 5m)
  - Locations where drainage cannot run off safely.

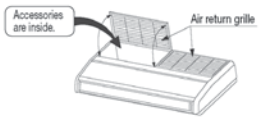
  It can affect performance or function and etc..
- **Do not put any valuables which will break down by getting wet under the air conditioner.**
  Condensation could drop when the relative humidity is higher than 80% or drain pipe is clogged, and it damages user's belongings.
- **Do not use the base frame for the outdoor unit which is corroded or damaged after a long period of use.**
  It could cause the unit falling down and injury.
- **Pay attention not to damage the drain pan by weld sputter when brazing work is done near the unit.**
  If sputter entered into the unit during brazing work, it could cause damage (pinhole) of drain pan and leakage of water. To avoid damaging, keep the indoor unit packed or cover the indoor unit.
- **Install the drain pipe to drain the water surely according to the installation manual.**
  Improper connection of the drain pipe may cause dropping water into room and damaging user's belongings.
- **Do not share the drain pipe for indoor unit and GHP (Gas Heat Pump system) outdoor unit.**
  Toxic exhaust gas would flow into room and it might cause serious damage (some poisoning or deficiency of oxygen) to user's health and safety.
- **Be sure to perform air tightness test by pressurizing with nitrogen gas after completed refrigerant piping work.**
  If the density of refrigerant exceeds the limit in the event of refrigerant leakage in the small room, lack of oxygen can occur, which can cause serious accidents.
- **For drain pipe installation, be sure to make descending slope of greater than 1/100, not to make traps, and not to make air-bleeding.**
  Check if the drainage is correctly done during commissioning and ensure the space for inspection and maintenance.
- **Ensure the insulation on the pipes for refrigeration circuit so as not to condense water.**
  Incomplete insulation could cause condensation and it would wet ceiling, floor, and any other valuables.
- **Do not install the outdoor unit where is likely to be a nest for insects and small animals.**
  Insects and small animals could come into the electronic components and cause breakdown and fire. Instruct the user to keep the surroundings clean.
- **Pay extra attention, carrying the unit by hand.**
  Carry the unit with 2 people if it is heavier than 20kg. Do not use the plastic straps but the grabbing place, moving the unit by hand. Use protective gloves in order to avoid injury by the aluminum fin.
- **Make sure to dispose of the packaging material.**
  Leaving the materials may cause injury as metals like nail and woods are used in the package.
- **Do not operate the system without the air filter.**
  It may cause the breakdown of the system due to clogging of the heat exchanger.
- **Do not touch any button with wet hands.**
  It could cause electric shock.
- **Do not touch the refrigerant piping with bare hands when in operation.**
  The pipe during operation would become very hot or cold according to the operating condition, and it could cause a burn or frostbite.
- **Do not clean up the air conditioner with water.**
  It could cause electric shock.
- **Do not turn off the power source immediately after stopping the operation.**
  Be sure to wait for more than 5 minutes. Otherwise it could cause water leakage or breakdown.
- **Do not control the operation with the circuit breaker.**
  It could cause fire or water leakage. In addition, the fan may start operation unexpectedly and it may cause injury.

## ①Before installation

- Install correctly according to the installation manual.
- Confirm the following points:
  - ○Unit type/Power supply specification ○Pipes/Wires/Small parts ○Accessory items

Accessory item

| For unit hanging | | For refrigerant pipe | | | For drain pipe | | | | | For air return grille |
|---|---|---|---|---|---|---|---|---|---|---|
| Rat washer (M10) | Paper pattern | Pipe cover (large) | Pipe cover (small) | Strap | Drain hose (with clamp) | Hose clamp | Fixing bracket | Screw | Heay insulation | Screw |
| | | | | | | | | | | |
| 8 | 1 | 1 | 1 | 4 | 1 | 1 | 1 | 2 | 1 | 4 |
| For unit hanging | For unit hanging and adjustment | For heat insulation of gas pipe | For heat insulation of liquid pipe | For fixing of pipe cover | For drain pipe connection | For drain hose mounting | For fixing of drain hose | For installing of fixing bracket | For drain hose | For fixing air return grille |




## ②Selection of installation location for the indoor unit

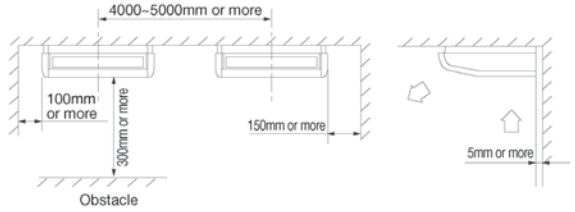
① Select the suitable areas to install the unit under approval of the user.
- Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 23°C and relative humidity is lower than 80%. This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.
- Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
  (A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

② Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

③ If there are 2 units of wireless type, keep them away for more than 6m to avoid malfunction due to cross communication.

④ When plural indoor units are installed nearby, keep them away for more than 4 to 5m.

Space for installation and service



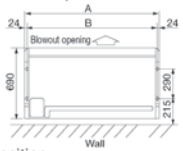

## ③Preparation before installation

- If suspension bolt becomes longer, do reinforcement of earthquake resistant.
  - ○For grid ceiling
    When suspension bolt length is over 500mm, or the gap between the ceiling and roof is over 700mm, apply earthquake resistant brace to the bolt.
  - ○In case the unit is hanged directly from the slab and is installed on the ceiling plane which has enough strength.
    When suspension bolt length is over 1000mm, apply the earthquake resistant brace to the bolt.
- Prepare four (4) sets of suspension bolt, nut and spring washer (M10) on site.

## ③Preparation before installation (continued)

Pitch of suspension bolts and pipe position

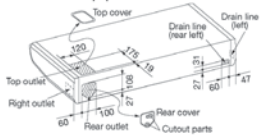
Pitch of suspension bolts




(mm)

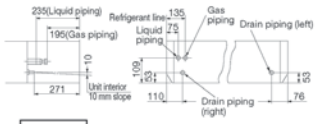
| Series | type | A | B |
|---|---|---|---|
| Single Split (PAC) series | 40 to 50type | 1070 | 1022 |
| | 60 to 71type | 1320 | 1272 |
| | 100 to 140type | 1620 | 1572 |
| VRF (KX) series | 36 to 56type | 1070 | 1022 |
| | 71type | 1320 | 1272 |
| | 112 to 140type | 1620 | 1572 |

Location of pipe outlets




※The outlet through which the pipings are taken out is available in three directions.

Pipe position



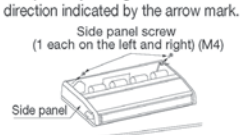

Haulage

- Move the box as close to the installation area as possible packed.
- If it must be unpacked, wrap the unit with a nylon sling, and be careful not to damage the unit.
- If you need to lay the unit on a floor after unpacking, always put it with the intake grille facing upward.

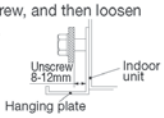
Preparation before instalation

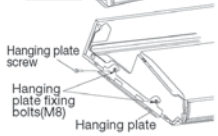
**1. Remove the air return grille.**
Slide stoppers (4 places) of the catches, then pull out the pins ( 4 or 6 places).

**2. Remove the side panel.**
Remove the screw and detach the side panel by sliding it toward the direction indicated by the arrow mark.




**3. Remove the hanging plate.**
Remove the screw, and then loosen the fixing bolts.




## ④Remote controller

Installation of remote controller

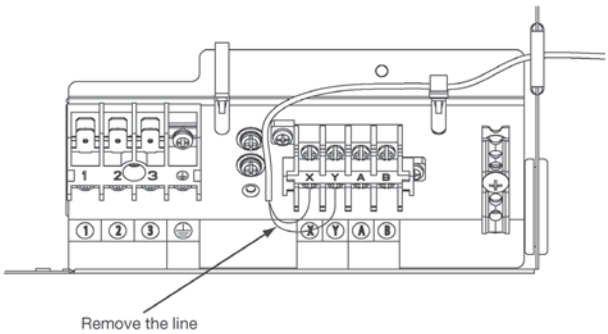
Up to two receiver or wired remote controller can be installed in one indoor unit group.

● When both wired and wireless remote controller are used
It is necessary to set wired or wireless remote controller as slave.
(For the method of changing the setting, refer to the installtion manual attached to remote controller or wireless kit.)

● When wired remote controller are used only (wireless type)
It is necessary to remove the line that is connected to the receiver.
Remove signal line connected to the receiver from primary side of terminal block (X, Y).

**ATTENTION**

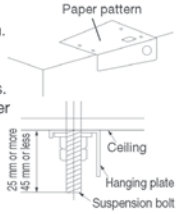
①Insulate with tape the removed line.
②The LED of that removed connector will not be able to make any indication.



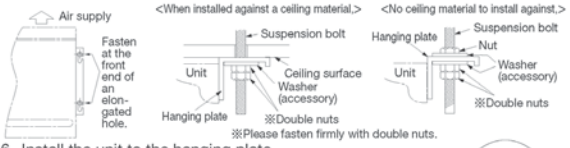
## ⑤Installation of indoor unit

Work procedure

1. Select the suspension bolt locations and the pipe hole location.
   (1) Use enclosed paper pattern as a reference, and drill the holes for the suspension bolts and pipe.
   ※Decide the locations based on direct measurements.
   (2) Once the locations are properly placed, the paper pattern can be removed.
2. Install the suspension bolts in place.
3. Fix with 4 suspension bolts, which can endure load of 500N.
4. Check the measurements given at the right figure for the length of the suspension bolts.

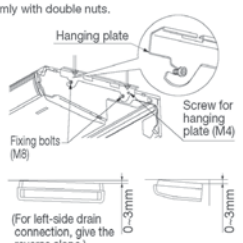



5. Fasten the hanging plate onto the suspension bolts.




※Please fasten firmly with double nuts.

6. Install the unit to the hanging plate.
   (1) Slide the unit in from front side to get it hanged on the hanging plate with the bolts.
   (2) Fasten the four fixing bolts (M8: 2 each on the left and right sides) firmly.
   (3) Fasten the two screws (M4: 1 each on the left and right sides).




⚠**WARNINIG** : Hang a side panel on from the panel side to the rear side and then fasten it securely onto the indoor unit with screws.

※To ensure smooth drain flow, install the unit with a descending slope toward the drain outlet.

⚠ **CAUTION** : Do not give the reversed slope, which may cause water leaks.

## ⑥Refrigerant pipe

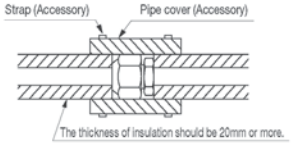
Caution

- ●Use the new refrigerant pipe.
  When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
  - Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
  - Do not use thin-walled pipes.
- ●Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation. In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.
- ●Do not use any refrigerant other than R410A.
  Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.
- ●Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.
- ●Use special tools for R410 refrigerant.

Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit.
   ※Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them. (Gas may come out at this time, but it is not abnormal.)
   ●Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
   ※Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
   ※Do a flare connection as follows:
   ●Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
   ●When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
   ●Make sure to insulate both gas pipes and liquid pipes completely.
   ※Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit.
   As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

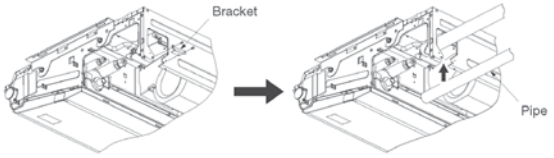
| Pipe diameter | Tightening torque N·m |
|---|---|
| ø 6.35 | 14 to 18 |
| ø 9.52 | 34 to 42 |
| ø 12.7 | 49 to 61 |
| ø 15.88 | 68 to 82 |
| ø 19.05 | 100 to 120 |



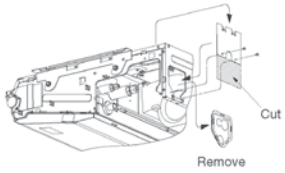

## ⑥Refrigerant pipe (continued)

The pipe can be connected from three different directions. (back, reight, top)

- ● When the pipe is routed through the back.
  If the bracket is removed, piping work will become easy.
  ※After piping, reinstall the removed bracket.




- ● When the pipe is routed through the back.
  Cut the removed top cover, and install to the rear panel instead of rear cover.




## ⑦Drain pipe

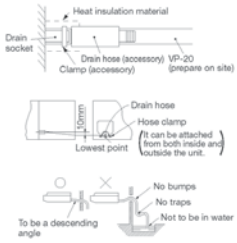
The drain pipes may face out towards the back to the left, or to the right side.

Caution

- ● Install the drain pipe according to the installation manual in order to drain properly. Imperfection in draining may cause flood indoors and wetting the household goods, etc.
- ● Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful andinflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.
- ● Connect the pipe securely to avoid water leakage from the joint.
- ● Insulate the pipe properly to avoid condensation drop.
- ● Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.
- ● Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

Work procedure

1. Insert drain hose completely to the base, and tighten the drain hose clamp securely. ( adhesive must not be used.)
   ※When plumbing on the left side, move the rubber plug and the cylindrical insulating materials by the pipe connecting hole on the left side of the unit to the right side.




⚠Beware of a possible outflow of water that may occur upon removal of a drain plug.

2. Fix the drain hose at the lowest point with a hose clamp supplied as an accessory.
   ※Give a drain hose a gradient of 10mm as illustrated in the right drawing by laying it without leaving a slack.
   ● Take head of electrical cables so that they may not run beneath the drain hose.

⚠A drain hose must be clamped down with a hose clamp. There is a possibility that drain water overflows.

3. Connect VP-20(prepare on site) to drain hose. (adhesive must not be used.)
   ※ Use commercially available rigid PVC general pipe VP-20 for drain pipe.
4. Do not to make the up-down bending and trap in the mid-way while assuming that the drain pipes is downhill. (more than 1/100)
   ● Never set up air vent.
5. Insulate the drain pipe.
   ● Insulate the drain hose clamp with the heat insulation supplied as accessories.
   ● When the unit is installed in a humid place, consider precautions against dew condensation such as heat insulation for the drain pipe.

Drain test

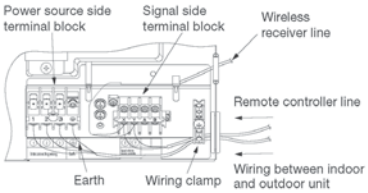
- ● After installation of drain pipe, make sure that drain system work in good condition and no water leakage from joint and drain pan.
- ● Do drain test even if installation of heating season.

## ⑧Wiring-out position and wiring connection

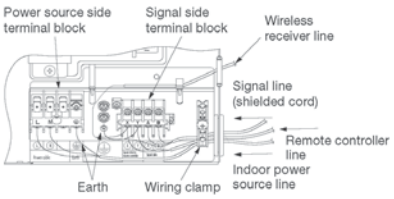
- Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country.
  Be sure to use an exclusive circuit.
- Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
- Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
- Be sure to do D type earth work.
- For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

1. Remove a lid of the electrical box (2 screws).
2. Hold each wiring inside the unit and connect to a terminal block surely.
3. Fix the wiring by clamps.
4. Install the removed parts back to original place.

Single split (PAC) series




VRF(KX) series




## ⑨Attaching the air return grille

●The air return grille must be attached when electrical cabling work is completed.

1. Fix the chains tied to the air return grille onto the indoor unit with screws supplied as accessories (4 pieces).
2. Close the air return grille.
   This completes the unit installtion work.

## ⑩Check list after installation

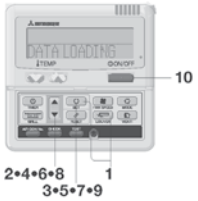
●Check the following items after all installation work completed.

| Check if | Expected trouble | Check |
|---|---|---|
| The indoor and outdoor units are fixed securely? | Falling, vibration, noise | |
| Inspection for leakage is done? | Insufficient capacity | |
| Insulation work is properly done? | Water leakage | |
| Water is drained properly? | Water leakage | |
| Supply voltage is same as mentioned in the model name plate? | PCB burnt out, not working at all | |
| There is mis-wiring or mis-connection of piping? | PCB burnt out, not working at all | |
| Earth wiring is connected properly? | Electric shock | |
| Cable size comply with specified size? | PCB burnt out, not working at all | |
| Any obstacle blocks airflow on air inlet and outlet? | Insufficient capacity | |

## ⑪How to set the airflow direction

It is possible to change the movable range of the louver on the air outlet from the wired remote controller. Once the top and bottom position is set, the louver will swing within the range between the top and the bottom when swing operation is chosen. It is also possible to apply different setting to each louver.

1. Stop the air conditioner and press ○ SET button and ⇦ LOUVER button simultaneously for three seconds or more.
   ●The following is displayed if the number of the indoor units connected to the remote controller is one. Go to step 4.
   "DATA LOADING"
   ↓
   "⇦ No.1 ▲"
   ●The following is displayed if the number of the indoor units connected to the remote controller are more than one.
   "↻ ⇕ SELECT I/U"
   ↓
   "I/U000 ▲"



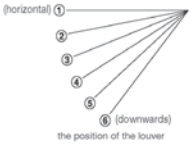

2. Press▲or▼button.(selection of indoor unit)●Select the indoor unit of which the louver is set.
   [EXAMPLE]
   "I/U000 ▲"⇔"I/U001 ⇕"⇔"I/U002 ⇕"⇔
   "I/U003 ⇕"

3. Press ○ SET button.(determination of indoor unit)●Selected indoor unit is fixed.
   [EXAMPLE]
   "I/U001 " (displayed for two seconds)
   ↓
   "DATA LOADING"
   ↓
   "⇦ No.1 ▲"

4. Press▲or▼button.(selection of louver No.)●Select the louver No. to be set according to the right figure.
   [EXAMPLE]
   "⇦ No.1 ▲"⇔"⇦ No.2 ⇕"⇔"⇦ No.3 ⇕"⇔
   "⇦ No.4 ▼"

5. Press ○ SET button.(Determination of louver No.)
   ●The louver No. to be set is confirmed and the display shows the upper limit of the movable range.
   [EXAMPLE] If No.1 louver is selected,
   "No.1 UPPER2 ⇕" ←current upper limit position

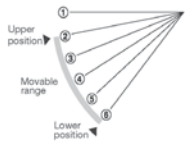
6. Press▲or▼button.(selection of upper limit position)
   ● Select the upper limit of louver movable range.
   "position 1" is the most horizontal, and "position 6" is the most downward.
   "position --" is to return to the factory setting.
   If you need to change the setting to the default setting, use "position --".
   "No.1 UPPER1 ▼" (the most horizotal)
   ⇔"No.1 UPPER2 ⇕"
   ⇔"No.1 UPPER3 ⇕"
   ⇔"No.1 UPPER4 ⇕"
   ⇔"No.1 UPPER5 ⇕"
   ⇔"No.1 UPPER6 ⇕" (the most downwards)
   ⇔"No.1 UPPER--- ▲" (return to the default setting)




7. Press ○ SET button.(Fixing of the upper limit position)
   ●The upper limit position is fixed and the setting position is displayed for two seconds. Then proceed to lower limit position selection display.
   [EXAMPLE]
   No.1 UPPER2 (displayed for two seconds)
   ↓
   No.1 LOWER5 ⇕ (shows current setting)

8. Press▲or▼button.(Selection of lower limit position)
   ●Select the lower limit position of louver.
   "position 1" is the most horizontal, and "position 6 "is the most downwards.
   "position --" is to return to the factory setting. If you need to change the setting to the default setting, use "position --".
   No.1 LOWER1 ▼ (the most horizontal)
   No.1 LOWER2 ⇕
   No.1 LOWER3 ⇕
   No.1 LOWER4 ⇕
   No.1 LOWER5 ⇕
   No.1 LOWER6 ⇕ (the most downwards)
   No.1 LOWER--- ▲ (return to the default setting)

9. Press ○ SET button.(Fixing of the lower limit position)
   ●Upper limit position and lower limit position are fixed, and the set positions are displayed for two seconds, then setting is completed.
   ・After the setting is completed, the louver which was set moves from the original position to the lower limit position, and goes back to the original position again. (This operation is not performed if the indoor unit and/or indoor unit fan is in operation.)
   [Example]
   No.1 U2 L6 (displayed for two seconds)
   SET COMPLETE
   ⇦ No.1 ▲




10.Press ⓘON/OFF button.
   ●Louver adjusting mode ends and returns to the original display.

**Caution**

If the upper limit position number and the lower limit position number are set to the same position, the louver is fixed at that position auto swing does not funtion.

**ATTENTION**

If you press ⇦ RESET button during settings, the display will return to previous display.If you press ⓘON/OFF button during settings, the mode will be ended and return to original display, and the settings that have not been completed will become invalid.

When plural remote controllers are connected, louver setting operation cannot be set by slave remote controller.

PJR012D319 A

## (4) Duct connected-Low / Middle static pressure type (FDUM)

This manual is for the installation of an indoor unit.
For electrical wiring work (Indoor), refer to the electrical wiring work installation manual. For remote controller installation, refer to the installation manual attached to a remote controller. For wireless kit installation, refer to the installation manual attached to a wireless kit. For electrical wiring work (Outdoor) and refrigerant pipe work installation for outdoor unit, refer to the installation manual attached to an outdoor unit.

### SAFETY PRECAUTIONS

- Read the "SAFETY PRECAUTIONS" carefully first of all and then strictly follow it during the installation work in order to protect yourself.
- The precautionary items mentioned below are distinguished into two levels, ⚠WARNING and ⚠CAUTION .
  ⚠WARNING : Wrong installation would cause serious consequences such as injuries or death.
  ⚠CAUTION : Wrong installation might cause serious consequences depending on circumstances.
  Both mentions the important items to protect your health and safety so strictly follow them by any means.
- The meanings of "Marks" used here are as shown on the right:
  ⃠ Never do it under any circumstances. ❗ Always do it according to the instruction.
- After completing the installation, do commissioning to confirm there are no abnormalities, and explain to the customers about "SAFETY PRECAUTIONS", correct operation method and maintenance method (air filter cleaning, operation method and temperature setting method) with user's manual of this unit.
  Ask your customers to keep this installation manual together with the user's manual. Also, ask them to hand over the user's manual to the new user when the owner is changed.

### ⚠WARNING

- **Installation should be performed by the specialist.**
  If you install the unit by yourself, it may lead to serious trouble such as water leakage, electric shock, fire, and injury due to overturn of the unit.
- **Install the system correctly according to these installation manuals.**
  Improper installation may cause explosion, injury, water leakage, electric shock, and fire.
- **Check the density refered by the foumula (accordance with ISO5149).**
  If the density exceeds the limit density, please consult the dealer and installate the ventilation system.
- **Use the genuine accessories and the specified parts for installation.**
  If parts unspecified by our company are used it could cause water leakage, electric shock, fire, and injury due to overturn of the unit.
- **Ventilate the working area well in case the refrigerant leaks during installation.**
  If the refrigerant contacts the fire, toxic gas is produced.
- **Install the unit in a location that can hold heavy weight.**
  Improper installation may cause the unit to fall leading to accidents.
- **Install the unit properly in order to be able to withstand strong winds such as typhoons, and earthquakes.**
  Improper installation may cause the unit to fall leading to accidents.
- **Do not mix air in to the cooling cycle on installation or removal of the air conditioner.**
  If air is mixed in, the pressure in the cooling cycle will rise abnormally and may cause explosion and injuries.
- **Be sure to have the electrical wiring work done by qualified electrical installer, and use exclusive circuit.**
  Power source with insufficient capacity and improper work can cause electric shock and fire.
- **Use specified wire for electrical wiring, fasten the wiring to the terminal securely, and hold the cable securely in order not to apply unexpected stress on the terminal.**
  Loose connections or hold could result in abnormal heat generation or fire.
- **Arrange the electrical wires in the control box properly to prevent them from rising. Fit the lid of the services panel property.**
  Improper fitting may cause abnormal heat and fire.
- **Check for refrigerant gas leakage after installation is completed.**
  If the refrigerant gas leaks into the house and comes in contact with a fan heater, a stove, or an oven, toxic gas is produced.
- **Use the specified pipe, flare nut, and tools for R410A.**
  Using existing parts (R22) could cause the unit failure and serious accident due to explosion of the cooling cycle.
- **Tighten the flare nut according to the specified method by with torque wrench.**
  If the flare nut were tightened with excess torque, it could cause burst and refrigerant leakage after a long period.
- **Do not put the drainage pipe directly into drainage channels where poisonous gases such as sulfide gas can occur.**
  Poisonous gases will flow into the room through drainage pipe and seriously affect the user's health and safety. This can also cause the corrosion of the indoor unit and a resultant unit failure or refrigerant leak.
- **Connect the pipes for refrigeration circuit securely in installation work before compressor is operated.**
  If the compressor is operated when the service valve is open without connecting the pipe, it could cause explosion and injuries due to abnormal high pressure in the system.
- **Stop the compressor before removing the pipe after shutting the service valve on pump down work.**
  If the pipe is removed when the compressor is in operation with the service valve open, air would be mixed in the refrigeration circuit and it could cause explosion and injuries due to abnormal high pressure in the cooling cycle.
- **Only use prescribed optional parts. The installation must be carried out by the qualified installer.**
  If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- **Do not repair by yourself. And consult with the dealer about repair.**
  Improper repair may cause water leakage, electric shock or fire.
- **Consult the dealer or a specialist about removal of the air conditioner.**
  Improper installation may cause water leakage, electric shock or fire.
- **Turn off the power source during servicing or inspection work.**
  If the power is supplied during servicing or inspection work, it could cause electric shock and injury by the operating fan.
- **Do not run the unit when the panel or protection guard are taken off.**
  Touching the rotating equipment, hot surface, or high voltage section could cause an injury to be caught in the machine, to get burned, or electric shock.
- **Shut off the power before electrical wiring work.**
  It could cause electric shock, unit failure and improper running.

### ⚠ CAUTION

- **Perform earth wiring surely.**
  Do not connect the earth wiring to the gas pipe, water pipe, lightning rod and telephone earth wiring. Improper earth could cause unit failure and electric shock due to a short circuit.
- **Earth leakage breaker must be installed.**
  If the earth leakage breaker is not installed, it can cause electric shocks.
- **Use the circuit breaker of correct capacity. Circuit breaker should be the one that disconnect all poles under over current.**
  Using the incorrect one could cause the system failure and fire.
- **Do not use any materials other than a fuse of correct capacity where a fuse should be used.**
  Connecting the circuit by wire or copper wire could cause unit failure and fire.
- **Do not install the indoor unit near the location where there is possibility of flammable gas leakages.**
  If the gas leaks and gathers around the unit, it could cause fire.
- **Do not install and use the unit where corrosive gas (such as sulfurous acid gas etc.) or flammable gas (such as thinner, petroleum etc.) may be generated or accumulated, or volatile flammable substances are handled.**
  It could cause the corrosion of heat exchanger, breakage of plastic parts etc. And inflammable gas could cause fire.
- **Secure a space for installation, inspection and maintenance specified in the manual.**
  Insufficient space can result in accident such as personal injury due to falling from the installation place.
- **Do not use the indoor unit at the place where water splashes such as laundry.**
  Indoor unit is not waterproof. It could cause electric shock and fire.
- **Do not use the indoor unit for a special purpose such as food storage, cooling for precision instrument, preservation of animals, plants, and a work of art.**
  It could cause the damage of the items.
- **Do not install nor use the system near equipments which generate electromagnetic wave or high harmonics.**
  Equipments like inverter equipment, private power generator, high-frequency medical equipment, or telecommunication equipment might influence the air conditioner and cause a malfunction and breakdown. Or the air conditioner might influence medical equipments or telecommunication equipments, and obstruct their medical activity or cause jamming.
- **Do not install the remote controller at the direct sunlight.**
  It could cause breakdown or deformation of the remote controller.
- **Do not install the indoor unit at the place listed below.**
  - Places where flammable gas could leak.
  - Places where carbon fiber, metal powder or any powder is floated.
  - Place where the substances which affect the air conditioner are generated such as sulfide gas, chloride gas, acid, alkali or ammonic atmospheres.
  - Places exposed to oil mist or steam directly.
  - On vehicles and ships
  - Places where machinery which generates high harmonics is used.
  - Places where cosmetics or special sprays are frequently used.
  - Highly salted area such as beach.
  - Heavy snow area
  - Places where the system is affected by smoke from a chimney.
  - Altitude over 1000m
- **Do not install the indoor unit in the locations listed below (Be sure to install the indoor unit according to the installation manual for each model because each indoor unit has each limitation)**
  - Locations with any obstacles which can prevent inlet and outlet air of the unit
  - Locations where vibration can be amplified due to insufficient strength of structure.
  - Locations where the infrared receiver is exposed to the direct sunlight or the strong light beam. (in case of the infrared specification unit)
  - Locations where an equipment affected by high harmonics is placed. (TV set or radio receiver is placed within 5m)
  - Locations where drainage cannot run off safely.

  It can affect performance or function and etc..
- **Do not put any valuables which will break down by getting wet under the air conditioner.**
  Condensation could drop when the relative humidity is higher than 80% or drain pipe is clogged, and it damages user's belongings.
- **Do not use the base frame for the outdoor unit which is corroded or damaged after a long period of use.**
  It could cause the unit falling down and injury.
- **Pay attention not to damage the drain pan by weld sputter when brazing work is done near the unit.**
  If sputter entered into the unit during brazing work, it could cause damage (pinhole) of drain pan and leakage of water. To avoid damaging, keep the indoor unit packed or cover the indoor unit.
- **Install the drain pipe to drain the water surely according to the installation manual.**
  Improper connection of the drain pipe may cause dropping water into room and damaging user's belongings.
- **Do not share the drain pipe for indoor unit and GHP (Gas Heat Pump system) outdoor unit.**
  Toxic exhaust gas would flow into room and it might cause serious damage (some poisoning or deficiency of oxygen) to user's health and safety.
- **Be sure to perform air tightness test by pressurizing with nitrogen gas after completed refrigerant piping work.**
  If the density of refrigerant exceeds the limit in the event of refrigerant leakage in the small room, lack of oxygen can occur, which can cause serious accidents.
- **For drain pipe installation, be sure to make descending slope of greater than 1/100, not to make traps, and not to make air-bleeding.**
  Check if the drainage is correctly done during commissioning and ensure the space for inspection and maintenance.
- **Ensure the insulation on the pipes for refrigeration circuit so as not to condense water.**
  Incomplete insulation could cause condensation and it would wet ceiling, floor, and any other valuables.
- **Do not install the outdoor unit where is likely to be a nest for insects and small animals.**
  Insects and small animals could come into the electronic components and cause breakdown and fire. Instruct the user to keep the surroundings clean.
- **Pay extra attention, carrying the unit by hand.**
  Carry the unit with 2 people if it is heavier than 20kg. Do not use the plastic straps but the grabbing place, moving the unit by hand. Use protective gloves in order to avoid injury by the aluminum fin.
- **Make sure to dispose of the packaging material.**
  Leaving the materials may cause injury as metals like nail and woods are used in the package.
- **Do not operate the system without the air filter.**
  It may cause the breakdown of the system due to clogging of the heat exchanger.
- **Do not touch any button with wet hands.**
  It could cause electric shock.
- **Do not touch the refrigerant piping with bare hands when in operation.**
  The pipe during operation would become very hot or cold according to the operating condition, and it could cause a burn or frostbite.
- **Do not clean up the air conditioner with water.**
  It could cause electric shock.
- **Do not turn off the power source immediately after stopping the operation.**
  Be sure to wait for more than 5 minutes. Otherwise it could cause water leakage or breakdown.
- **Do not control the operation with the circuit breaker.**
  It could cause fire or water leakage. In addition, the fan may start operation unexpectedly and it may cause injury.

○This model is middle static ducted type air conditioning unit. Therefore, do not use this model for direct blow type air conditioning unit.

## ①Before installation

●Install correctly according to the installation manual.

●Confirm the following points:

○Unit type/Power supply specification ○Pipes/Wires/Small parts ○Accessory items

Accessory item

| For refrigerant pipe | | | For drain pipe | | | |
|---|---|---|---|---|---|---|
| Pipe cover(big) | Pipe cover (small) | Strap | Pipe cover(big) | Pipe cover(small) | Drain hose | Hose clamp |
| 1 | 1 | 4 | 1 | 1 | 1 | 1 |
| For heat insulation of gas pipe | For heat insulation of liquid tube | For pipe cover fixing | For heat insulation of drain socket | For heat insulation of drain socket | For drain pipe connecting | For drain hose mounting |

Accessory parts are stored inside this suction side.

## ②Selection of installation location for the indoor unit

① Select the suitable areas to install the unit under approval of the user.

- Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 28°C and relative humidity is lower than 80%.

This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
If there is a possibility to use it under such a condition, attach additional insulation of 10 to 20mm thick for entire surface of indoor unit, refrigeration pipe and drain pipe.

- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.
- Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
(A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

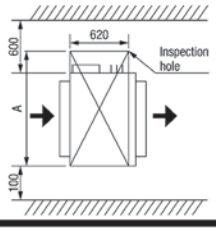
②Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

Space for installation and service

●Make installation altitude over 2.5m.

(Indoor Unit)

Installation Space




UNIT: mm

| Multi type | 22~56 | 71, 90 | 112, 140 |
|---|---|---|---|
| Single type | 50 | 60, 71 | 100~140 |
| A | 1100 | 1300 | 1720 |

## ③Preparation before installation

●If suspension bolt becomes longer, do reinforcement of earthquake resistant.

○For grid ceiling
When the suspension bolt length is over 500mm, or the gap between the ceiling and roof is over 700mm, apply earthquake resistant brace to the bolt.

○In case the unit is hanged directly from the slab and is installed on the ceiling plane which has enough strength.
When suspension bolt length is over 1000mm, apply the earthquake resistant brace to the bolt.

●Prepare four (4) sets of suspension bolt, nut and spring washer (M10) on site.

Suspension Bolt Location

○ Adhere to the measurements given below for the length of the suspension bolts.

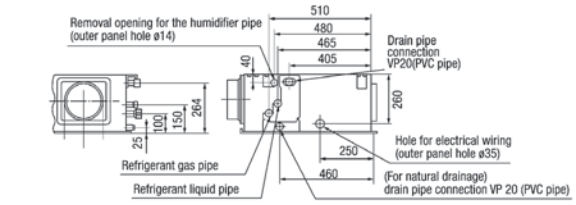
UNIT: mm

| Multi type | 22~56 | 71, 90 | 112, 140 |
|---|---|---|---|
| Single type | 50 | 60, 71 | 100~140 |
| A | 786 | 986 | 1406 |

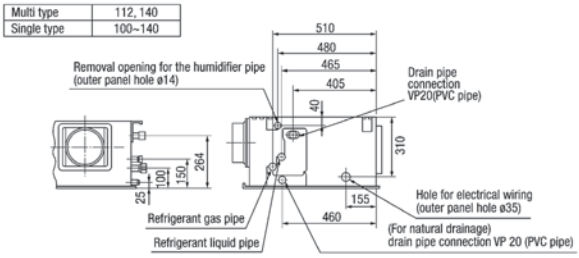
## ③Preparation before installation (continued)

Pipe locations UNIT: mm

| Multi type | 22~90 |
|---|---|
| Single type | 50~71 |



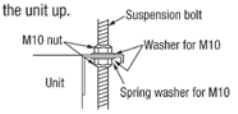

| Multi type | 112, 140 |
|---|---|
| Single type | 100~140 |




## ④Installation of indoor unit

Installation

[Hanging]
Hang the unit up.

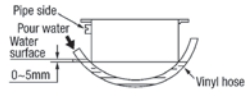


If the measurements between the unit and the ceiling hole do not match upon installation, it may be adjusted with the long holed installation tool.

Adjustment for horizontality

○Either use a level vial, or adjust the level according to the method below.

●Adjust so the bottom side of the unit will be leveled with the water surface as illustrated below.




Let the pipe side be slightly sloped.

○If the unit is not leveled, it may cause malfunctions or inoperation of the float switch.

## ⑤Duct Work

①A corrugated board (for preventing sputtering) is attached to the main body of the air conditioner (on the outlet port). Do not remove it until connecting the duct.

●An air filter can be provided on the main body of the air conditioner (on the inlet port). Remove it when connecting the duct on the inlet port.

②Blowout duct

●Use according to the spot numbers shown in the table below with a 200 circular duct.

| Multi type | 22 | 36, 45, 56 | 71, 90 | 112, 140 |
|---|---|---|---|---|
| Single type | – | 50 | 56, 71 | 100~140 |
| Spot numbers | 1 spot | 2 spots | 3 or 2 spots | 4 or 3 spots |

●The difference of the duct lengths between each spot should be less than 2:1.

●The ducts should be at their minimum lengths.

●Keep the bends to a minimum. (The bending radius should be as large as possible.)

●Tie and secure the connection to the duct flange of the main unit/blowout hole with a band. Then, apply insulation materials to the secured part for dew condensation prevention.

●Use of the sound and heat insulated flexible duct is recommended for condensation prevention and soundproofing. (sold separately; 1m, 2m, 4m available)

●Conduct the duct work before ceiling attachment.

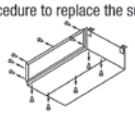
③Inlet port

●When shipped the inlet port lies on the back.

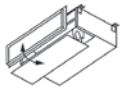
●When connecting the duct to the inlet port, remove the air filter if it is fitted to the inlet port.

## ⑤Duct Work (continued)

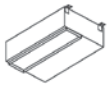
●When placing the inlet port to carry out suction from the bottom side, use the following procedure to replace the suction duct joint and the bottom plate.



●Remove the screws which fasten the bottom plate and the duct joint on the inlet port side of the unit.



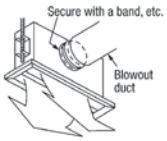
●Replace the removed bottom plate and duct joint.



●Fit the duct join with a screw; fit the bottom plate.

●Make sure to insulate the duct to prevent dewing on it.

④Install the specific blowout duct in a location where the air will circulate to the entire room.

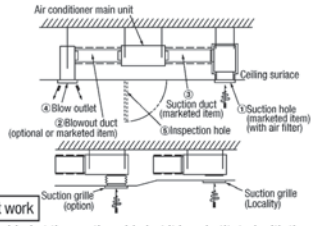



●The duct connection is specific to the 200 circular duct.

●Conduct the installation of the specific blowout hole and the connection of the duct before attaching them to the ceiling.

●Insulate the area where the duct is secured by a band for dew condensation prevention.

⑤Make sure provide an inspection hole on the ceiling. It is indispensable to service elecric equipment, motor, functional components and cleaning of heat exchanger.




### Bad example of duct work

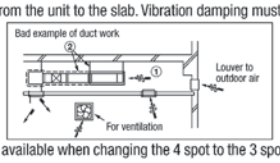
①If a duct is not provided at the suction side but it is substituted with the space over the ceiling, humidity in the space will increase by the influence of capacity of ventilation fan, strength of wind blowing against the out door air louver, weather (rainy day) and others.

a)Moisture in air is likely to condense over the external plates of the unit and to drip on the ceiling. Unit should be operated under the conditions as listed in the above table and within the limitation of wind volume. When the building is a concrete structure, especially immediately after the construction, humidity tends to rise even if the space over the ceiling is not substituted in place of a duct. In such occasion, it is necessary to insulate the entire unit with glass wool (25mm). (Use a wire net or equivalent to hold the glass wool in place.)

b)It may run out the allowable limit of unit operation (Example: When outdoor air temperature is 35°C DB, suction air temperature is 27°C WB) and it could result in such troubles as compressor overload, etc..

c)There is a possibility that the blow air volume may exceed the allowable range of operation due to the capacity of ventilation fan or strength of wind blowing against external air louver so that drainage from be heat exchanger may fall to reach the drain pan but leak outside (Example: drip on to the ceiling) with consequential water leakage in the room.

②If vibration damping is not conducted between the unit and the duct, and between the unit and the slab, vibration will be transmitted to the duct and vibration noise may occur. Also, vibration may be transmitted from the unit to the slab. Vibration damping must be performed.

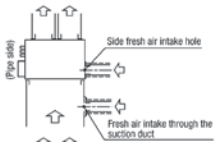



### Notice

A specific cover plate is available when changing the 4 spot to the 3 spot, or when changing the 3 spot to the 2 spot.
Note: Do not change from 2 spot to 1 spot.

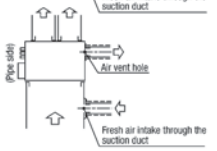
### Connecting the air intake/vent ducts

①Fresh Air Intake
[for air intake duct only]
○Use the side fresh air intake hole, or supply through a part of the suction duct.




[for simultaneous air intake/vent]
○Intake air through the suction duct.
(the side cannot be used)

②Air Vent
○Use the side air vent hole.
(always use together with the air intake)




○Use the duct flange for the air intake/vent (sold separately; for 125 circular duct connection), and connect the 125 circular duct (tighten with band).
○Insulate the duct to protect it from dew condensation.

## ⑥Refrigerant pipe

### Caution

●Use the new refrigerant pipe.
When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
・Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
・Do not use thin-walled pipes.

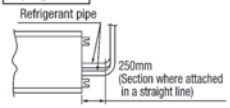
●Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation.
In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.

●Do not use any refrigerant other than R410A.
Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.

●Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.

●Use special tools for R410 refrigerant.

### Piping work

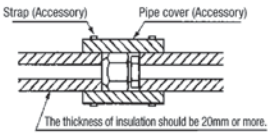



When conducting piping work, make sure to allow the pipes to be aligned in a straight line for at least 250 mm, as shown in the left illustration. (This is necessary for the drain pump to function)

### Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit.
※ Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them. (Gas may come out at this time, but it is not abnormal.)
● Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
※Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
※Do a flare connection as follows:
● Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
● When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
●Make sure to insulate both gas pipes and liquid pipes completely.
※Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit.
As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

| Pipe diameter | Tightening torque N·m |
|---|---|
| ϕ 6.35 | 14 to 18 |
| ϕ 9.52 | 34 to 42 |
| ϕ 12.7 | 49 to 61 |
| ϕ 15.88 | 68 to 82 |
| ϕ 19.05 | 100 to 120 |




## ⑦Drain pipe

### Caution

● Install the drain pipe according to the installation manual in order to drain properly.
Imperfection in draining may cause flood indoors and wetting the household goods, etc.

● Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.

● Connect the pipe securely to avoid water leakage from the joint.

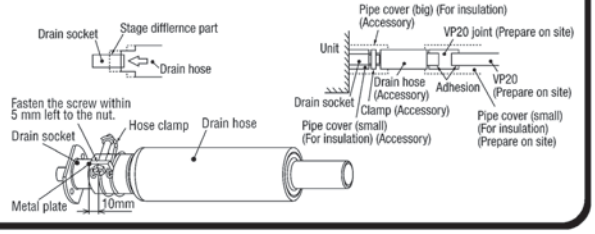
● Insulate the pipe properly to avoid condensation drop.

● Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.

● Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

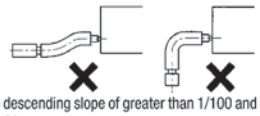
### Work procedure

1. Make sure to insert the drain hose (the end mode of soft PVC) to the end of the step part of drain socket.
Attach the hose clamp to the drain hose around 10mm from the end, and fasten the screw within 5mm left to the nut.
●Do not apply adhesives on this end.
●Do not use acetone-based adhesives to connect to the drain socket.

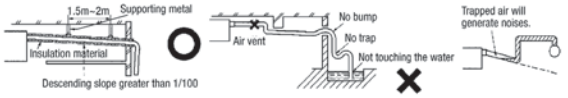


## ⑦Drain pipe (continued)

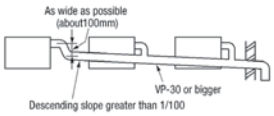
2. Prepare a joint for connecting VP-20 pipe, adhere and connect the joint to the drain hose (the end made of rigid PVC), and adhere and connect VP-20 pipe (prepare on site).
※As for drain pipe, apply VP-20 made of rigid PVC which is on the market.
● Make sure that the adhesive will not get into the supplied drain hose. It may cause the flexible part broken after the adhesive is dried up and gets rigid.
● The flexible drain hose is intended to absorb a small difference at installation of the unit or drain pipes. Intentional bending, expanding may cause the flexible hose broken and water leakage.



3. Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway.
● Pay attention not to give stress on the pipe on the indoor unit side, and support and fix the pipe as close place to the unit as possible when connecting the drain pipe.
● Do not set up air vent.



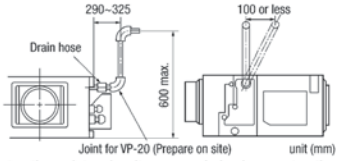

● When sharing a drain pipe for more than one unit, lay the main pipe 100mm below the drain outlet of the unit. In addition, select VP-30 or bigger size for main drain pipe.




4. Insulate the drain pipe.
● Be sure to insulate the drain socket and rigid PVC pipe installed indoors otherwise it may cause dew condensation and water leakage.
※ After drainage test implementation, cover the drain socket part with pipe cover (small size), then use the pipe cover (big size) to cover the pipe cover (small size), clamps and part of the drain hose, and fix and wrap it with tapes to wrap and make joint part gapless.

**Drain up**

● The position for drain pipe outlet can be raised up to 600mm above the ceiling. Use elbows for installation to avoid obstacles inside ceiling. If the horizontal drain pipe is too long before vertical pipe, the backflow of water will increase when the unit is stopped, and it may cause overflow of water from the drain pan on the indoor unit. In order to avoid overflow, keep the horizontal pipe length and offset of the pipe within the limit shown in the figure below.



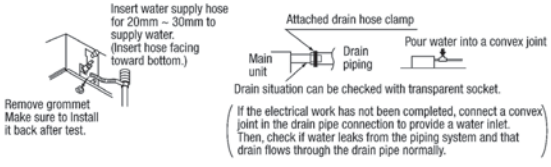

Otherwise, the construction point makes it same as drain pipe construction.

**Drain test**

1. Conduct a drain test after completion of the electrical work.
2. During the trail, make sure that drain flows properly through the piping and that no water leaks from connections.
3. In case of a new building, conduct the test before it is furnished with the ceiling.
4. Be sure to conduct this test even when the unit is installed in the heating season.

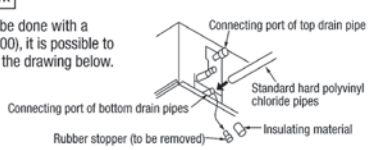
**Procedures**

1. Supply about 1000 cc of water to the unit through the air outlet by using a feed water pump.
2. Check the drain while cooling operation.


Insert water supply hose for 20mm ~ 30mm to supply water. (Insert hose facing toward bottom.)
Remove grommet Make sure to install it back after test.
Attached drain hose clamp
Main unit
Drain piping
Pour water into a convex joint
Drain situation can be checked with transparent socket.
If the electrical work has not been completed, connect a convex joint in the drain pipe connection to provide a water inlet. Then, check if water leaks from the piping system and that drain flows through the drain pipe normally.

**Outline of bottom drain piping work**

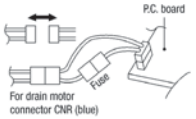
● If the bottom drain piping can be done with a descending gradient (1/50-1/100), it is possible to connect the pipes as shown in the drawing below.


Connecting port of top drain pipe
Standard hard polyvinyl chloride pipes
Connecting port of bottom drain pipes
Insulating material
Rubber stopper (to be removed)

**Uncoupling the drain motor connector**

● Uncouple the connector CNR for the drain motor as illustrated in the drawing on the right.

( Note: If the unit is run with the connector coupled, drain water will be discharged from the upper drain pipe joint, causing a water leak. )




## ⑦Drain pipe (continued)

**Drain pump operation**

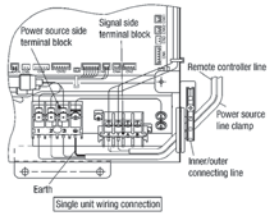
○In case electrical wiring work finished
Drain pump can be operated by remote controller (wired).
For the operation method, refer to Operation for drain pump in the installation manual for wiring work.

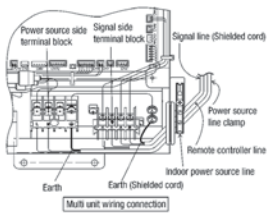
○In case electrical wiring work not finished
Drain pump will run continuously when the dip switch"SW7-1" on the indoor unit PCB is turned ON, the Connector CNB is disconnected, and then the power supply (230VAC on the terminal block ① and ②) is turned ON. Make sure to turn OFF "SW7-1" and reconnect the Connector CNB after the test.

## ⑧Wiring-out position and wiring connection

● Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country.
Be sure to use an exclusive circuit.
● Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
● Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
● Be sure to do D type earth work.
● For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

1. Remove a lid of the control box (2 screws).
2. Hold each wiring inside the unit and fasten them to terminal block securely.
3. Fix the wiring with clamps.
4. Install the removed parts back to original place.




## ⑨Check list after installation

●Check the following items after all installation work completed.

| Check if | Expected trouble | Check |
|---|---|---|
| The indoor and outdoor units are fixed securely? | Falling, vibration, noise | |
| Inspection for leakage is done? | Insufficient capacity | |
| Insulation work is properly done? | Water leakage | |
| Water is drained properly? | Water leakage | |
| Supply voltage is same as mentioned in the model name plate? | PCB burnt out, not working at all | |
| There is mis-wiring or mis-connection of piping? | PCB burnt out, not working at all | |
| Earth wiring is connected properly? | Electric shock | |
| Cable size comply with specified size? | PCB burnt out, not working at all | |
| Any obstacle blocks airflow on air inlet and outlet? | Insufficient capacity | |

## ⑩Tap selection on blower unit (when the high peformance filter is used)

Following table shows the maximum external static pressure for models adapted to the fan setting speed (Hi, UH). Select at site the fan setting speed according to the external static pressure.

50/60Hz

| | | | | |
|---|---|---|---|---|
| Multi type | | 22~56 | 71, 90, 140 | 112 |
| Single type | | 50 | 60, 71, 125, 140 | 100 |
| Fan Speed | Hi | 60/60 | 60/60 | 60/60 |
| | UH | 85/90 | 85/100 | 90/100 |

Unit:Pa

**⚠ CAUTION**

● Taps should not be used under external static pressure mentioned above. Dew condensation may occur with the unit and wet the ceiling or furniture.
● Do not use under external static pressure of 60Pa or less. Water drops may be blown from the diffuser outlet of the unit and wet the ceiling or furniture.

PJD012D052 A

### (5) Duct connected-High static pressure type (FDU)

This manual is for the installation of an indoor unit.
For electrical wiring work (Indoor), refer to the electrical wiring work installation manual. For remote controller installation, refer to the installation manual attached to a remote controller. For wireless kit installation, refer to the installation manual attached to a wireless kit. For electrical wiring work (Outdoor) and refrigerant pipe work installation for outdoor unit, refer to the installation manual attached to an outdoor unit.

## SAFETY PRECAUTIONS

- Read the "SAFETY PRECAUTIONS" carefully first of all and then strictly follow it during the installation work in order to protect yourself.
- The precautionary items mentioned below are distinguished into two levels, ⚠WARNING and ⚠CAUTION .
  ⚠WARNING : Wrong installation would cause serious consequences such as injuries or death.
  ⚠CAUTION : Wrong installation might cause serious consequences depending on circumstances.
  Both mentions the important items to protect your health and safety so strictly follow them by any means.
- The meanings of "Marks" used here are as shown on the right:
  ⃠ Never do it under any circumstances. ❗ Always do it according to the instruction.
- After completing the installation, do commissioning to confirm there are no abnormalities, and explain to the customers about "SAFETY PRECAUTIONS", correct operation method and maintenance method (air filter cleaning, operation method and temperature setting method) with user's manual of this unit.
  Ask your customers to keep this installation manual together with the user's manual. Also, ask them to hand over the user's manual to the new user when the owner is changed.

### ⚠WARNING

- **Installation should be performed by the specialist.**
  If you install the unit by yourself, it may lead to serious trouble such as water leakage, electric shock, fire, and injury due to overturn of the unit.
- **Install the system correctly according to these installation manuals.**
  Improper installation may cause explosion, injury, water leakage, electric shock, and fire.
- **Check the density refered by the foumula (accordance with ISO5149).**
  If the density exceeds the limit density, please consult the dealer and installate the ventilation system.
- **Use the genuine accessories and the specified parts for installation.**
  If parts unspecified by our company are used it could cause water leakage, electric shock, fire, and injury due to overturn of the unit.
- **Ventilate the working area well in case the refrigerant leaks during installation.**
  If the refrigerant contacts the fire, toxic gas is produced.
- **Install the unit in a location that can hold heavy weight.**
  Improper installation may cause the unit to fall leading to accidents.
- **Install the unit properly in order to be able to withstand strong winds such as typhoons, and earthquakes.**
  Improper installation may cause the unit to fall leading to accidents.
- **Do not mix air in to the cooling cycle on installation or removal of the air conditioner.**
  If air is mixed in, the pressure in the cooling cycle will rise abnormally and may cause explosion and injuries.
- **Be sure to have the electrical wiring work done by qualified electrical installer, and use exclusive circuit.**
  Power source with insufficient capacity and improper work can cause electric shock and fire.
- **Use specified wire for electrical wiring, fasten the wiring to the terminal securely, and hold the cable securely in order not to apply unexpected stress on the terminal.**
  Loose connections or hold could result in abnormal heat generation or fire.
- **Arrange the electrical wires in the control box properly to prevent them from rising. Fit the lid of the services panel property.**
  Improper fitting may cause abnormal heat and fire.
- **Check for refrigerant gas leakage after installation is completed.**
  If the refrigerant gas leaks into the house and comes in contact with a fan heater, a stove, or an oven, toxic gas is produced.
- **Use the specified pipe, flare nut, and tools for R410A.**
  Using existing parts (R22) could cause the unit failure and serious accident due to explosion of the cooling cycle.
- **Tighten the flare nut according to the specified method by with torque wrench.**
  If the flare nut were tightened with excess torque, it could cause burst and refrigerant leakage after a long period.
- **Do not put the drainage pipe directly into drainage channels where poisonous gases such as sulfide gas can occur.**
  Poisonous gases will flow into the room through drainage pipe and seriously affect the user's health and safety. This can also cause the corrosion of the indoor unit and a resultant unit failure or refrigerant leak.
- **Connect the pipes for refrigeration circuit securely in installation work before compressor is operated.**
  If the compressor is operated when the service valve is open without connecting the pipe, it could cause explosion and injuries due to abnormal high pressure in the system.
- **Stop the compressor before removing the pipe after shutting the service valve on pump down work.**
  If the pipe is removed when the compressor is in operation with the service valve open, air would be mixed in the refrigeration circuit and it could cause explosion and injuries due to abnormal high pressure in the cooling cycle.
- **Only use prescribed optional parts. The installation must be carried out by the qualified installer.**
  If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- **Do not repair by yourself. And consult with the dealer about repair.**
  Improper repair may cause water leakage, electric shock or fire.
- **Consult the dealer or a specialist about removal of the air conditioner.**
  Improper installation may cause water leakage, electric shock or fire.
- **Turn off the power source during servicing or inspection work.**
  If the power is supplied during servicing or inspection work, it could cause electric shock and injury by the operating fan.
- **Do not run the unit when the panel or protection guard are taken off.**
  Touching the rotating equipment, hot surface, or high voltage section could cause an injury to be caught in the machine, to get burned, or electric shock.
- **Shut off the power before electrical wiring work.**
  It could cause electric shock, unit failure and improper running.

### ⚠ CAUTION

- **Perform earth wiring surely.**
  Do not connect the earth wiring to the gas pipe, water pipe, lightning rod and telephone earth wiring. Improper earth could cause unit failure and electric shock due to a short circuit.
- **Earth leakage breaker must be installed.**
  If the earth leakage breaker is not installed, it can cause electric shocks.
- **Use the circuit breaker of correct capacity. Circuit breaker should be the one that disconnect all poles under over current.**
  Using the incorrect one could cause the system failure and fire.
- **Do not use any materials other than a fuse of correct capacity where a fuse should be used.**
  Connecting the circuit by wire or copper wire could cause unit failure and fire.
- **Do not install the indoor unit near the location where there is possibility of flammable gas leakages.**
  If the gas leaks and gathers around the unit, it could cause fire.
- **Do not install and use the unit where corrosive gas (such as sulfurous acid gas etc.) or flammable gas (such as thinner, petroleum etc.) may be generated or accumulated, or volatile flammable substances are handled.**
  It could cause the corrosion of heat exchanger, breakage of plastic parts etc. And inflammable gas could cause fire.
- **Secure a space for installation, inspection and maintenance specified in the manual.**
  Insufficient space can result in accident such as personal injury due to falling from the installation place.
- **Do not use the indoor unit at the place where water splashes such as laundry.**
  Indoor unit is not waterproof. It could cause electric shock and fire.
- **Do not use the indoor unit for a special purpose such as food storage, cooling for precision instrument, preservation of animals, plants, and a work of art.**
  It could cause the damage of the items.
- **Do not install nor use the system near equipments which generate electromagnetic wave or high harmonics.**
  Equipments like inverter equipment, private power generator, high-frequency medical equipment, or telecommunication equipment might influence the air conditioner and cause a malfunction and breakdown. Or the air conditioner might influence medical equipments or telecommunication equipments, and obstruct their medical activity or cause jamming.
- **Do not install the remote controller at the direct sunlight.**
  It could cause breakdown or deformation of the remote controller.
- **Do not install the indoor unit at the place listed below.**
  - Places where flammable gas could leak.
  - Places where carbon fiber, metal powder or any powder is floated.
  - Place where the substances which affect the air conditioner are generated such as sulfide gas, chloride gas, acid, alkali or ammonic atmospheres.
  - Places exposed to oil mist or steam directly.
  - On vehicles and ships
  - Places where machinery which generates high harmonics is used.
  - Places where cosmetics or special sprays are frequently used.
  - Highly salted area such as beach.
  - Heavy snow area
  - Places where the system is affected by smoke from a chimney.
  - Altitude over 1000m
- **Do not install the indoor unit in the locations listed below (Be sure to install the indoor unit according to the installation manual for each model because each indoor unit has each limitation)**
  - Locations with any obstacles which can prevent inlet and outlet air of the unit
  - Locations where vibration can be amplified due to insufficient strength of structure.
  - Locations where the infrared receiver is exposed to the direct sunlight or the strong light beam. (in case of the infrared specification unit)
  - Locations where an equipment affected by high harmonics is placed. (TV set or radio receiver is placed within 5m)
  - Locations where drainage cannot run off safely.

  It can affect performance or function and etc..
- **Do not put any valuables which will break down by getting wet under the air conditioner.**
  Condensation could drop when the relative humidity is higher than 80% or drain pipe is clogged, and it damages user's belongings.
- **Do not use the base frame for the outdoor unit which is corroded or damaged after a long period of use.**
  It could cause the unit falling down and injury.
- **Pay attention not to damage the drain pan by weld sputter when brazing work is done near the unit.**
  If sputter entered into the unit during brazing work, it could cause damage (pinhole) of drain pan and leakage of water. To avoid damaging, keep the indoor unit packed or cover the indoor unit.
- **Install the drain pipe to drain the water surely according to the installation manual.**
  Improper connection of the drain pipe may cause dropping water into room and damaging user's belongings.
- **Do not share the drain pipe for indoor unit and GHP (Gas Heat Pump system) outdoor unit.**
  Toxic exhaust gas would flow into room and it might cause serious damage (some poisoning or deficiency of oxygen) to user's health and safety.
- **Be sure to perform air tightness test by pressurizing with nitrogen gas after completed refrigerant piping work.**
  If the density of refrigerant exceeds the limit in the event of refrigerant leakage in the small room, lack of oxygen can occur, which can cause serious accidents.
- **For drain pipe installation, be sure to make descending slope of greater than 1/100, not to make traps, and not to make air-bleeding.**
  Check if the drainage is correctly done during commissioning and ensure the space for inspection and maintenance.
- **Ensure the insulation on the pipes for refrigeration circuit so as not to condense water.**
  Incomplete insulation could cause condensation and it would wet ceiling, floor, and any other valuables.
- **Do not install the outdoor unit where is likely to be a nest for insects and small animals.**
  Insects and small animals could come into the electronic components and cause breakdown and fire. Instruct the user to keep the surroundings clean.
- **Pay extra attention, carrying the unit by hand.**
  Carry the unit with 2 people if it is heavier than 20kg. Do not use the plastic straps but the grabbing place, moving the unit by hand. Use protective gloves in order to avoid injury by the aluminum fin.
- **Make sure to dispose of the packaging material.**
  Leaving the materials may cause injury as metals like nail and woods are used in the package.
- **Do not operate the system without the air filter.**
  It may cause the breakdown of the system due to clogging of the heat exchanger.
- **Do not touch any button with wet hands.**
  It could cause electric shock.
- **Do not touch the refrigerant piping with bare hands when in operation.**
  The pipe during operation would become very hot or cold according to the operating condition, and it could cause a burn or frostbite.
- **Do not clean up the air conditioner with water.**
  It could cause electric shock.
- **Do not turn off the power source immediately after stopping the operation.**
  Be sure to wait for more than 5 minutes. Otherwise it could cause water leakage or breakdown.
- **Do not control the operation with the circuit breaker.**
  It could cause fire or water leakage. In addition, the fan may start operation unexpectedly and it may cause injury.

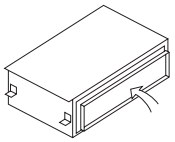
○This model is middle static ducted type air conditioning unit. Therefore, do not use this model for direct blow type air conditioning unit.

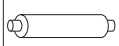
## ①Before installation

●Install correctly according to the installation manual.
●Confirm the following points:
○Unit type/Power supply specification
○Pipes/Wires/Small parts
○Accessory items

Accessory item

| For refrigerant pipe | | |
|---|---|---|
| Pipe cover(big) | Pipe cover (small) | Strap |
| | | |
| 1 | 1 | 4 |
| For heat insulation of gas pipe | For heat insulation of liquid tube | For pipe cover fixing |


Accessory parts are stored inside this suction side.

| For drain pipe | | | |
|---|---|---|---|
| Pipe cover(big) | Pipe cover(small) | Drain hose | Hose clamp |
| | |  | |
| 1 | 1 | 1 | 1 |
| For heat insulation of drain socket | For heat insulation of drain socket | For drain pipe connecting | For drain hose mounting |

## ②Selection of installation location for the indoor unit

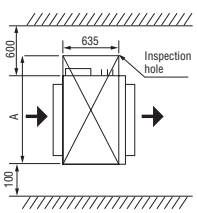
① Select the suitable areas to install the unit under approval of the user.
- Areas where the indoor unit can deliver hot and cold wind sufficiently. Suggest to the user to use a circulator if the ceiling height is over 3m to avoid warm air being accumulated on the ceiling.
- Areas where there is enough space to install and service.
- Areas where it can be drained properly. Areas where drain pipe descending slope can be taken.
- Areas where there is no obstruction of airflow on both air return grille and air supply port.
- Areas where fire alarm will not be accidentally activated by the air conditioner.
- Areas where the supply air does not short-circuit.
- Areas where it is not influenced by draft air.
- Areas not exposed to direct sunlight.
- Areas where dew point is lower than around 28°C and relative humidity is lower than 80%.
  This indoor unit is tested under the condition of JIS (Japan Industrial Standard) high humidity condition and confirmed there is no problem. However, there is some risk of condensation drop if the air conditioner is operated under the severer condition than mentioned above.
  If there is a possibility to use it under such a condition, attach additional insulation of 10 to 20mm thick for entire surface of indoor unit, refrigeration pipe and drain pipe.
- Areas where TV and radio stays away more than 1m. (It could cause jamming and noise.)
- Areas where any items which will be damaged by getting wet are not placed such as food, table wares, server, or medical equipment under the unit.
- Areas where there is no influence by the heat which cookware generates.
- Areas where not exposed to oil mist, powder and/or steam directly such as above fryer.
- Areas where lighting device such as fluorescent light or incandescent light doesn't affect the operation.
  (A beam from lighting device sometimes affects the infrared receiver for the wireless remote controller and the air conditioner might not work properly.)

②Check if the place where the air conditioner is installed can hold the weight of the unit. If it is not able to hold, reinforce the structure with boards and beams strong enough to hold it. If the strength is not enough, it could cause injury due to unit falling.

Space for installation and service

●Make installation altitude over 2.5m.
(Indoor Unit)

Installation Space



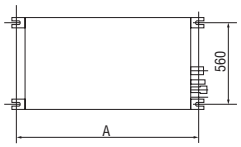

UNIT: mm

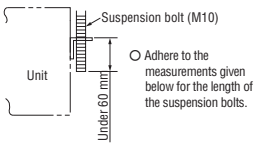
| | | |
|---|---|---|
| Multi type | 71 | 90, 112, 140 |
| Single type | 71 | 100, 125, 140 |
| A | 1200 | 1720 |

## ③Preparation before installation

●If suspension bolt becomes longer, do reinforcement of earthquake resistant.
○For grid ceiling
When the suspension bolt length is over 500mm, or the gap between the ceiling and roof is over 700mm, apply earthquake resistant brace to the bolt.
○In case the unit is hanged directly from the slab and is installed on the ceiling plane which has enough strength.
When suspension bolt length is over 1000mm, apply the earthquake resistant brace to the bolt.
●Prepare four (4) sets of suspension bolt, nut and spring washer (M10) on site.

Suspension Bolt Location



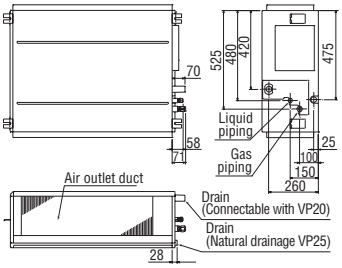




UNIT: mm

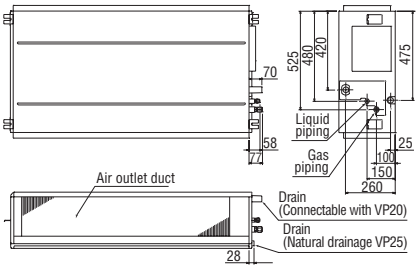
| | | |
|---|---|---|
| Multi type | 71 | 90, 112, 140 |
| Single type | 71 | 100, 125, 140 |
| A | 986 | 1406 |

Pipe locations UNIT: mm

| | |
|---|---|
| Multi type | 71 |
| Single type | 71 |



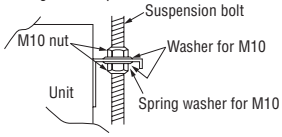

| | |
|---|---|
| Multi type | 90, 112, 140 |
| Single type | 100, 125, 140 |




## ④Installation of indoor unit

Installation

[Hanging]
Hang the unit up.

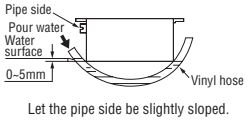


If the measurements between the unit and the ceiling hole do not match upon installation, it may be adjusted with the long holed installation tool.

Adjustment for horizontality

○Either use a level vial, or adjust the level according to the method below.

●Adjust so the bottom side of the unit will be leveled with the water surface as illustrated below.




Let the pipe side be slightly sloped.

○If the unit is not leveled, it may cause malfunctions or inoperation of the float switch.

## ⑤Duct Work

A corrugated board (for preventing sputtering) is attached to the main body of the air conditioner (on the outlet port). Do not remove it until connecting the duct.

①●The air conditioner main unit does not have an air filter. Incorporate it into the easy-to-clean suction grille.

②Blowout duct

●The ducts should be at their minimum lengths.

●Keep the bends to a minimum. (The bending radius should be as large as possible.)

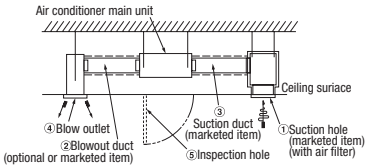
●Conduct the duct work before ceiling attachment.

③Suction duct

●Make sure to insulate the duct to prevent dewing on it.

④Location and form of blow outlet should be selected so that air from the outlet will be distributed all over the room, and equipped with a device to control air volume.

⑤Make sure provide an inspection hole on the ceiling. It is indispensable to service elecric equipment, motor, functional components and cleaning of heat exchanger.




Bad example of duct work

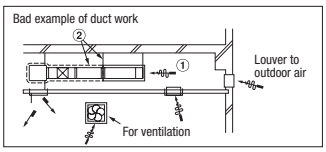
①If a duct is not provided at the suction side but it is substituted with the space over the ceiling, humidity in the space will increase by the influence of capacity of ventilation fan, strength of wind blowing against the out door air louver, weather (rainy day) and others.

a)Moisture in air is likely to condense over the external plates of the unit and to drip on the ceiling. Unit should be operated under the conditions as listed in the above table and within the limitation of wind volume. When the building is a concrete structure, especially immediately after the construction, humidity tends to rise even if the space over the ceiling is not substituted in place of a duct. In such occasion, it is necessary to insulate the entire unit with glass wool (25mm). (Use a wire net or equivalent to hold the glass wool in place.)

b)It may run out the allowable limit of unit operation (Example: When outdoor air temperature is 35°C DB, suction air temperature is 27°C WB) and it could result in such troubles as compressor overload, etc..

c)There is a possibility that the blow air volume may exceed the allowable range of operation due to the capacity of ventilation fan or strength of wind blowing against external air louver so that drainage from be heat exchanger may fall to reach the drain pan but leak outside (Example: drip on to the ceiling) with consequential water leakage in the room.

②If vibration damping is not conducted between the unit and the duct, and between the unit and the slab, vibration will be transmitted to the duct and vibration noise may occur. Also, vibration may be transmitted from the unit to the slab. Vibration damping must be performed.




## ⑥Refrigerant pipe

Caution

●Use the new refrigerant pipe.
When re-using the existing pipe system for R22 or R407C, pay attention to the following items.
・Change the flare nuts with the attached ones (JIS category 2), and reprocess the flare parts.
・Do not use thin-walled pipes.

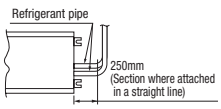
●Use phosphorus deoxidized copper alloy seamless pipe (C1220T specified in JIS H3300) for refrigeration pipe installation. In addition, make sure there is no damage both inside and outside of the pipe, and no harmful substances such as sulfur, oxide, dust or a contaminant stuck on the pipes.

●Do not use any refrigerant other than R410A.
Using other refrigerant except R410A (R22 etc.) may degrade inside refrigeration oil. And air getting into refrigeration circuit may cause over-pressure and resultant it may result in bursting, etc.

●Store the copper pipes indoors and seal the both end of them until they are brazed in order to avoid any dust, dirt or water getting into pipe. Otherwise it will cause degradation of refrigeration oil and compressor breakdown, etc.

●Use special tools for R410 refrigerant.

Piping work



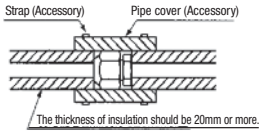

When conducting piping work, make sure to allow the pipes to be aligned in a straight line for at least 250 mm, as shown in the left illustration. (This is necessary for the drain pump to function)

## ⑥Refrigerant pipe (continued)

Work procedure

1. Remove the flare nut and blind flanges on the pipe of the indoor unit.
※ Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
(Gas may come out at this time, but it is not abnormal.)
● Pay attention whether the flare nut pops out. (as the indoor unit is sometimes pressured.)
2. Make a flare on liquid pipe and gas pipe, and connect the refrigeration pipes on the indoor unit.
※Bend the pipe with as big radius as possible and do not bend the pipe repeatedly. In addition, do not twist and crush the pipes.
※Do a flare connection as follows:
● Make sure to loosen the flare nut with holding the nut on pipe side with a spanner and giving torque to the nut with another spanner in order to avoid unexpected stress to the copper pipe, and then remove them.
● When fastening the flare nut, align the refrigeration pipe with the center of flare nut, screw the nut for 3-4 times by hand and then tighten it by spanner with the specified torque mentioned in the table below. Make sure to hold the pipe on the indoor unit securely by a spanner when tightening the nut in order to avoid unexpected stress on the copper pipe.
3. Cover the flare connection part of the indoor unit with attached insulation material after a gas leakage inspection, and tighten both ends with attached straps.
●Make sure to insulate both gas pipes and liquid pipes completely.
※Incomplete insulation may cause dew condensation or water dropping.
4. Refrigerant is charged in the outdoor unit.
As for the additional refrigerant charge for the indoor unit and piping, refer to the installation manual attached to the outdoor unit.

| Pipe diameter | Tightening torque N·m |
|---|---|
| ϕ 6.35 | 14 to 18 |
| ϕ 9.52 | 34 to 42 |
| ϕ 12.7 | 49 to 61 |
| ϕ 15.88 | 68 to 82 |
| ϕ 19.05 | 100 to 120 |



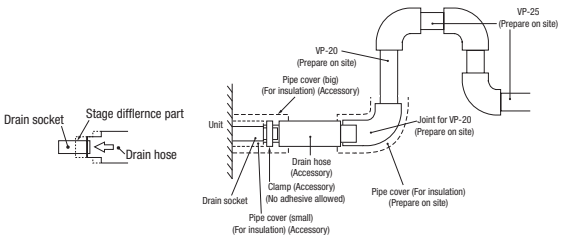

## ⑦Drain pipe

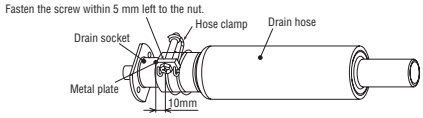
Caution

● Install the drain pipe according to the installation manual in order to drain properly.
Imperfection in draining may cause flood indoors and wetting the household goods, etc.
● Do not put the drain pipe directly into the ditch where toxic gas such as sulfur, the other harmful and inflammable gas is generated. Toxic gas would flow into the room and it would cause serious damage to user's health and safety (some poisoning or deficiency of oxygen). In addition, it may cause corrosion of heat exchanger and bad smell.
● Connect the pipe securely to avoid water leakage from the joint.
● Insulate the pipe properly to avoid condensation drop.
● Check if the water can flow out properly from both the drain outlet on the indoor unit and the end of the drain pipe after installation.
● Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway. In addition, do not put air vent on the drain pipe. Check if water is drained out properly from the pipe during commissioning. Also, keep sufficient space for inspection and maintenance.

Work procedure

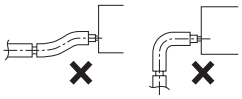
1. Make sure to insert the drain hose (the end mode of soft PVC) to the end of the step part of drain socket.
Attach the hose clamp to the drain hose around 10mm from the end, and fasten the screw within 5mm left to the nut.
●Do not apply adhesives on this end.
●Do not use acetone-based adhesives to connect to the drain socket.



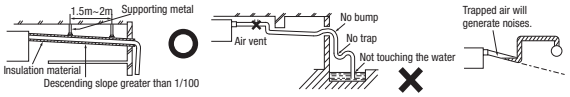



## ⑦Drain pipe (continued)

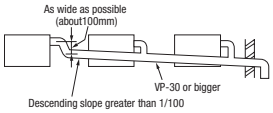
2. Prepare a joint for connecting VP-20 pipe, adhere and connect the joint to the drain hose (the end made of rigid PVC), and adhere and connect VP-20 pipe (prepare on site).
   ※As for drain pipe, apply VP-20 made of rigid PVC which is on the market.
   - When installing drain pipe, use VP-20 for the pipe goes up the closest to the unit, and VP-25 or higher number product for farther pipes.
   - Make sure that the adhesive will not get into the supplied drain hose.
     It may cause the flexible part broken after the adhesive is dried up and gets rigid.
   - The flexible drain hose is intended to absorb a small difference at installation of the unit or drain pipes. Intentional bending, expanding may cause the flexible hose broken and water leakage.



3. Make sure to make descending slope of greater than 1/100 and do not make up-down bend and/or trap in the midway.
   - Pay attention not to give stress on the pipe on the indoor unit side, and support and fix the pipe as close place to the unit as possible when connecting the drain pipe.
   - Do not set up air vent.



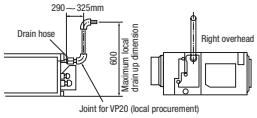

   - When sharing a drain pipe for more than one unit, lay the main pipe 100mm below the drain outlet of the unit. In addition, select VP-30 or bigger size for main drain pipe.




4. Insulate the drain pipe.
   - Be sure to insulate the drain socket and rigid PVC pipe installed indoors otherwise it may cause dew condensation and water leakage.
     ※ After drainage test implementation, cover the drain socket part with pipe cover (small size), then use the pipe cover (big size) to cover the pipe cover (small size), clamps and part of the drain hose, and fix and wrap it with tapes to wrap and make joint part gapless.

Drain up

- The position for drain pipe outlet can be raised up to 600mm above the ceiling. Use elbows for installation to avoid obstacles inside ceiling. If the horizontal drain pipe is too long before vertical pipe, the backflow of water will increase when the unit is stopped, and it may cause overflow of water from the drain pan on the indoor unit. In order to avoid overflow, keep the horizontal pipe length and offset of the pipe within the limit shown in the figure below.



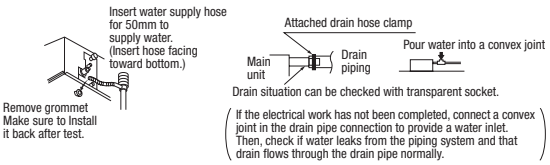

Otherwise, the construction point makes it same as drain pipe construction.

Drain test

1. Conduct a drain test after completion of the electrical work.
2. During the trail, make sure that drain flows properly through the piping and that no water leaks from connections.
3. In case of a new building, conduct the test before it is furnished with the ceiling.
4. Be sure to conduct this test even when the unit is installed in the heating season.

Procedures

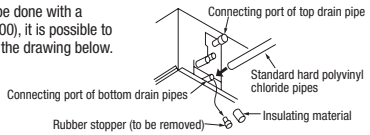
1. Supply about 1000 cc of water to the unit through the air outlet by using a feed water pump.
2. Check the drain while cooling operation.


Insert water supply hose for 50mm to supply water. (Insert hose facing toward bottom.)
Remove grommet
Make sure to Install it back after test.
Attached drain hose clamp
Pour water into a convex joint
Main unit
Drain piping
Drain situation can be checked with transparent socket.

( If the electrical work has not been completed, connect a convex joint in the drain pipe connection to provide a water inlet. Then, check if water leaks from the piping system and that drain flows through the drain pipe normally. )

Outline of bottom drain piping work

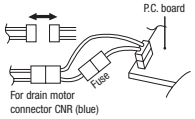
- If the bottom drain piping can be done with a descending gradient (1/50-1/100), it is possible to connect the pipes as shown in the drawing below.


Connecting port of top drain pipe
Standard hard polyvinyl chloride pipes
Connecting port of bottom drain pipes
Insulating material
Rubber stopper (to be removed)

Uncoupling the drain motor connector

- Uncouple the connector CNR for the drain motor as illustrated in the drawing on the right.

( Note: If the unit is run with the connector coupled, drain water will be discharged from the upper drain pipe joint, causing a water leak. )




## ⑦Drain pipe (continued)

Drain pump operation

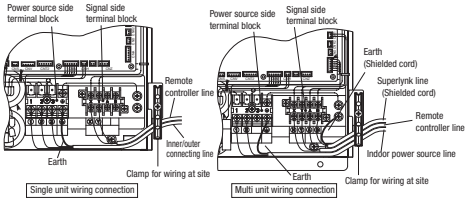
○In case electrical wiring work finished
Drain pump can be operated by remote controller (wired).
For the operation method, refer to Operation for drain pump in the installation manual for wiring work.

○In case electrical wiring work not finished
Drain pump will run continuously when the dip switch"SW7-1" on the indoor unit PCB is turned ON, the Connector CNB is disconnected, and then the power supply (230VAC on the terminal block ① and ②) is turned ON.
Make sure to turn OFF "SW7-1" and reconnect the Connector CNB after the test.

## ⑧Wiring-out position and wiring connection

- Electrical installation work must be performed according to the installation manual by an electrical installation service provider qualified by a power provider of the country, and be executed according to the technical standards and other regulations applicable to electrical installation in the country.
  Be sure to use an exclusive circuit.
- Use specified cord, fasten the wiring to the terminal securely, and hold the cord securely in order not to apply unexpected stress on the terminal.
- Do not put both power source line and signal line on the same route. It may cause miscommunication and malfunction.
- Be sure to do D type earth work.
- For the details of electrical wiring work, see attached instruction manual for electrical wiring work.

1. Remove a lid of the control box (2 screws).
2. Hold each wiring inside the unit and fasten them to terminal block securely.
3. Fix the wiring with clamps.
4. Install the removed parts back to original place.




## ⑨Check list after installation

- Check the following items after all installation work completed.

| Check if | Expected trouble | Check |
|---|---|---|
| The indoor and outdoor units are fixed securely? | Falling, vibration, noise | |
| Inspection for leakage is done? | Insufficient capacity | |
| Insulation work is properly done? | Water leakage | |
| Water is drained properly? | Water leakage | |
| Supply voltage is same as mentioned in the model name plate? | PCB burnt out, not working at all | |
| There is mis-wiring or mis-connection of piping? | PCB burnt out, not working at all | |
| Earth wiring is connected properly? | Electric shock | |
| Cable size comply with specified size? | PCB burnt out, not working at all | |
| Any obstacle blocks airflow on air inlet and outlet? | Insufficient capacity | |

## ⑩Tap selection on blower unit (when the high peformance filter is used)

The fan tap's factory setting is "Standard." If you want to change it to the high static-pressure setting, you can avail yourself of the following two methods. Use one of the two methods to set the fan tap.
Make sure to perform the functional setting with remote controller.
Select [I/U FUNCTION] in the functional setting mode, and change the function number [02] [FAN SPEED SET].
For operation method, refer to the user's manual of the remote controller.

| Function number A | Functional content B | Setting content C | Default setting |
|---|---|---|---|
| 02 | Fan Speed Set | Standard | ○ |
| | | High Speed 1 | |

UNIT: Pa

| | | |
|---|---|---|
| Static Pressure | Standard Tap | 60 |
| | High Speed 1 Tap | 130 |

**⚠ CAUTION**

If the external static pressure is 60Pa or less, do not set the fan speed to High speed 1. If High speed 1 setting is done, air outlet speed from indoor unit will increase and waterdrop may be blown out and wet the ceiling or the furniture.

# (6) Wall mounted type (SRK)

RKY012A007

This instruction manual illustrates the method of installing an indoor unit.
For electrical wiring work, please see instructions set out on the backside.
For outdoor unit installation and refrigerant piping, please refer to the installation manual that comes with your outdoor unit.
A wired remote control unit is supplied separately as an optional part.

## SAFETY PRECAUTIONS

- Please read these "Safety Precautions" first then accurately execute the installation work.
- For installing qualified personnel, take precautions in respect to themselves by using suitable protective clothing, groves, etc., and then perform the installation works.
- Though the precautionary points indicated herein are divided under two headings, ⚠ WARNING and ⚠ CAUTION, those points which are related to the strong possibility of an installation done in error resulting in death, serious injury or environmental pollution are listed in the ⚠ WARNING section. However, there is also a possibility of serious consequences in relationship to the points listed in the ⚠ CAUTION section as well. In either case, important safety related information is indicated, so by all means, properly observe all that is mentioned.
- Please pay attention not to fall down the tools, etc. when installing the unit at the high position.
- After completing the installation, along with confirming that no abnormalities were seen from the operation tests. Please explain operating methods as well as maintenance methods to the user (customer) of this equipment, based on the user's manual. Moreover, ask the customer to keep this sheet together with the user's manual.
- If unusual noise can be heard during operation, consult the dealer.

### ⚠ WARNING

- To disconnect the appliance from the mains supply this appliance must be connected to the mains by means of a circuit breaker or a switch (use a recognized 16A) with a contact separation of at least 3mm.
- The appliance shall be installed in accordance with national wiring regulations.
- When a plug is connected to the power cord, a plug conforming to the IEC60884-1 standard must be used.
- This system should be applied to places as households, residences and the like. Application to inferior environment such as engineering shop could cause equipment malfunction.
- Please entrust installation to either the company which sold you the equipment or to a professional contractor. Defects from improper installations can be the cause of water leakage, electric shocks and fires.
- Execute the installation accurately, based on following the installation manual. Again, improper installations can result in water leakage, electric shocks and fires.
- For installation, confirm that the installation site can sufficiently support heavy weight. When strength is insufficient, injury can result from a falling of the unit.
- For electrical work, please see that a licensed electrician executes the work while following the safety standards related to electrical equipment, and local regulations as well as the installation instructions, and that only exclusive use circuits are used.
  Insufficient power source circuit capacity and defective installment execution can be the cause of electric shocks and fires.
- Accurately connect wiring using the proper cable, and insure that the external force of the cable is not conducted to the terminal connection part, through properly securing it. Improper connection or securing can result in heat generation or fire.
- Take care that wiring does not rise upward, and accurately install the lid/service panel. It's improper installation can also result in heat generation or fire.
- Always use accessory parts and authorized parts for installation construction. Using parts not authorized by this company can result in water leakage, electric shock, fire and refrigerant leakage.
- Ventilate the work area when refrigerant leaks during the operation.
  Coming in contact with fire, refrigerant could generate toxic gas.
- Confirm after the foundation construction work that refrigerant does not leak.
  If coming in contact with fire of a fan heater, a stove or a movable cooking stove, etc., refrigerant leaking in the room could generate toxic gas.
- Turn off the power source during working on the inside of the unit such as servicing or installing work.
  This may cause electric shock.
- Use only pipe, flare nut and tools that have been designed to operate with R410A.
  Using existing parts (R22) may cause the unit failure, even as due to serious accident such as explosion of the cooling cycle or injury etc.
- For pump down work, stop the compressor before removing the refrigerant pipe.
  If the refrigerant pipe is removed when the compressor is in operation with the service valves open (liquid side and gas side), air would be mixed in the refrigerant circuit and this may cause explosion and injuries due to abnormal high pressure in the cooling cycle.
- Connect the pipes for refrigerant circuit securely in installation work before compressor is operated
  If the compressor is operated when the service valve is open without connecting the pipe, this may cause frostbite and injuries due to refrigerant leakage rapidly. Also, the unit is absorbed the air etc., this may cause explosion and injuries due to abnormal high pressure in the cooling cycle.
- Tighten the flare nut by torque wrench with specified method.
  If the flare nut were tightened with excess torque, this may cause burst and refrigerant leakage after a long period, and then, this may cause generate the harmful substance due to touch the flammable materials.
- Make sure there is no dust or clogging on both plug and socket nor loose connection of the socket before plugging of the power plug. Then, the power plug must be inserted tightly.
  Accumulation of dust, clogging on the socket or plug, or loose installation of the socket may cause electric shock and fire. Replace the socket if it is loose.
- Do not open the service valves (liquid side and gas side) until refrigerant piping construction, air-tightness test and evacuation are completed
  This may cause frostbite and injuries due to refrigerant leakage rapidly. Also, if the refrigerant gas leakage occurs during installing work, stop the work such as brazing work and then ventilation of the room. This may cause generate the toxic gas due to touch the flammable materials.

- Do not put the drain pipe directly into the ditch where toxic gas such as sulfur is generated.
  Toxic gas would flow into the room. Also, this may cause corrosion of indoor unit, and malfunction or refrigerant leakage.
- Be sure to bring back the packing material, form polystyrene, band and vinyl back etc., of the indoor and/or outdoor units after complete the installation work, and then implement appropriate measures such as breaking them.
- When setting up or moving the location of the air conditioner, do not mix air etc. or anything other than the designated refrigerant (R410A) within the refrigeration cycle.
  Rupture and injury caused by abnormal high pressure can result from such mixing.
- Do not processing, splice the power cord, or share a socket with other power plugs.
  This may cause fire or electric shock due to defecting contact, defecting insulation and over-current etc.
- Do not bundling, winding or processing for the power cord. Or, do not deforming the power plug due to tread it
  This may cause fire or heating.
- Do not vent R410A into the atomosphere:R410A is a fluor inated greenhouse gas. covered by the Kyoto Protocol with a Groval Warming Potential (GWP) =1975

- Execute proper grounding. Do not connect the ground wire to a gas pipe, water pipe, lightning rod or a telephone ground wire. Improper placement of ground wires can result in electric shock.

### ⚠ CAUTION

- Please avoid installing this unit in the locations where oil splashes and moisture are abundant (e.g., kitchens, mechanical workshops) or where the outside air is likely to flow in. These locations may cause corrosion and lower performance of the heat exchanger and cause damage to plastic parts.
- Please avoid installing this unit in the locations with corrosive gases (such as sulfurous acid gas), inflammable gases (such as thinner, gasoline) and areas where there are possibilities of gas accumulation or where a volatile inflammable material is handled. These locations can cause corrosion to the heat exchanger and damage to plastic parts. Also, the inflammable gas could cause fire.
- Please avoid installing this unit in the vicinity of equipment generating electromagnetic waves such as hospital equipment or equipment generating high-frequency waves. A failure to observe this instruction may result in controller performance errors due to noise generation.
- Please avoid installing and using this unit in a place where it is subject to sea breezes (coastal area). Installation in such a place may result in the corrosion of exterior panels and the heat exchanger.
- Do not place the remote control at locations that receives direct sunlight. This may cause malfunction and deformation.
- Spatters from welding, etc., if hit the unit, can damage (pinhole) its drain pan and other components and cause a water leak. Care must be taken in performing a welding operation near this unit and take necessary precautions to prevent spatters from entering this unit.
- For installation work, be careful not to get injured with the heat exchanger, piping flare portion or screws etc.
- For the drain pipe, follow the installation manual to insure that it allows proper drainage and thermally insulate it to prevent condensation. Inadequate plumbing can result in water leakage and water damage to interior items.
- The installation of an earth leakage breaker is necessary depending on the established location of the unit. Not installing an earth leakage breaker may result in electric shock.
- When perform the air conditioner operation (cooling or drying operation) in which ventilator is installed in the room. In this case, using the air conditioner in parallel with the ventilator, there is the possibility that drain water may backflow in accordance with the room lapse into the negative pressure status. Therefore, set up the opening port such as incorporate the air into the room that may appropriate to ventilation (For example; Open the door a little). In addition, just as above, so set up the opening port if the room lapse into negative pressure status due to register of the wind for the high rise apartment etc.
- Secure the regulated space for inspection and maintenance
  When it is not possible to keep enough space, this may cause injury due to falling from the installation place.
- To prevent the falling, institute the everlasting ladder and handrail etc., to the aisle when installing the outdoor unit in the location with rooftop or altitude. Or, for surrounding of the outdoor unit, institute the fence and handrail etc., to the aisle to prevent the falling.
- Performing the heat insulation and condensation of the refrigerant piping
  If the heat insulation and condensation of the refrigerant piping is not correctly, this may cause the water leakage, dew dropping and household wetting etc.
- Be careful not to injury due to damage of the unit installing work when leaving of the packaging materials.

- Do not install the unit where there is a concern about leakage of combustible gas.
  The rare event of leaked gas collecting around the unit could result in an outbreak of fire.
- Do not touch the suction or aluminum fin on the outdoor unit
  This may cause injury.
- Do not install the outdoor unit where is likely to be a nest for small animals
  Small animals may come into the electronic components and may cause breakdown and fire. Also,instruct the user to keep the surroundings clean.
- Do not install the outdoor unit at the place where fan airflow falls on the garden tree etc.
  This may cause damage to the garden tree etc., due to the fan airflow.
- Do not put anything on the outdoor unit and operating the unit.
  This may cause damage the objects or injury due to falling to the object.

- Symbols which appear frequently in the text have the following meaning

| | | | | | |
|---|---|---|---|---|---|
| | Strictly prohibited | | Observe instructions with great care | | Provide proper earthing |

## CAUTIONS FOR INSTALLATION

- The system should be applied to places as households, residences and the like.
- The equipment shall be installed in accordance with national wiring regulations.
- The connection to the fixed wiring of the mains supply must be made via a double pole isolating switch with a contact gap of at least 3mm in each pole.
- When the outdoor unit has a possibility of being overturned or being displaced and fall from its original installation position, the outdoor unit should be fixed in its position by use of anchor bolts or wires.

## BEFORE INSTALLATION

○Before installation check that the power supply matches the air conditioner.

| Standard accessories (Installation kit) Accessories for indoor unit | | Q'ty |
|---|---|---|
| ① | Installation board (Attached to the rear of the indoor unit) | 1 |
| ② | Wireless remote control | 1 |
| ③ | Remote control holder | 1 |
| ④ | Tapping screws (for installation board 4dia. by 25mm) | 4 |
| ⑤ | Wood screw (for remote control switch holder 3.5(mm). by 16mm) | 2 |
| ⑥ | Battery [R03(AAA,Micro) 1.5V] | 2 |
| ⑦ | Air-cleaning filters | 2 |
| ⑧ | Filter holders (Attached to the front panel of indoor unit) | 2 |
| ⑨ | Insulation (#486 50 x 100 t3) | 1 |

| Option parts | | Q'ty |
|---|---|---|
| ⓐ | Sealing plate | 1 |
| ⓑ | Sleeve | 1 |
| ⓒ | Inclination plate | 1 |
| ⓓ | Putty | 1 |
| ⓔ | Drain hose (extention hose) | 1 |
| ⓕ | Piping cover (for insulation of connection piping) | 1 |

| Necessary tools for the installation work | |
|---|---|
| 1 | Plus headed driver |
| 2 | Knife |
| 3 | Saw |
| 4 | Tape measure |
| 5 | Hammer |
| 6 | Spanner wrench |
| 7 | Torque wrench (14.0 ~ 61.0N•m (1.4 ~ 6.1kgf•m)) |
| 8 | Hole core drill (65mm in diameter) |
| 9 | Wrench key (Hexagon) [4m/m] |
| 10 | Flaring tool set (Designed specifically for R410A) |
| 11 | Gas leak detector (Designed specifically for R410A) |
| 12 | Gauge for projection adjustment (Used when flare is made by using conventional flare tool) |
| 13 | Pipe bender |

# SELECTION OF INSTALLATION LOCATION

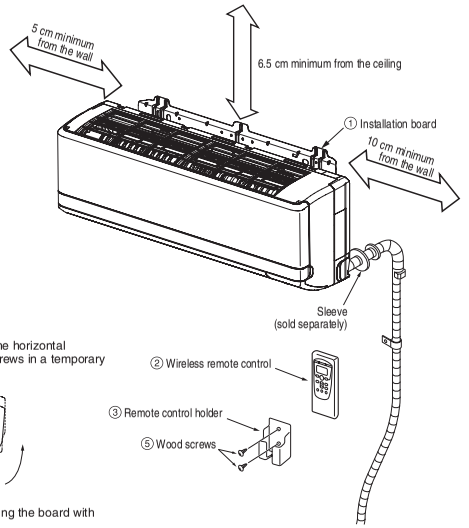
(Install at location that meets the following conditions, after getting approval from the customer)

### Indoor unit

○ Where there is no obstructions to the air flow and where the cooled and heated air can be evenly distributed.
○ A solid place where the unit or the wall will not vibrate.
○ A place where there will be enough space for servicing. (Where space mentioned below can be secured)
○ Where wiring and the piping work will be easy to conduct.
○ The place where receiving part is not exposed to the direct rays of the sun or the strong rays of the street lighting.
○ A place where it can be easily drained.
○ A place separated at least 1m away from the television or the radio. (To prevent interference to images and sounds.)
○ Places where this unit is not affected by the high frequency equipment or electric equipment.
○ Avoid installing this unit in place where there is much oil mist.
○ Places where there is no electric equipment or household under the installing unit.

### Wireless remote control

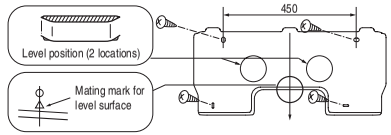
○ A place where the air conditioner can be received the signal surely during operating the wireless remote control.
○ Places where there is no affected by the TV and radio etc.
○ Do not place where exposed to direct sunlight or near heat devices such as a stove.


5 cm minimum from the wall
6.5 cm minimum from the ceiling
① Installation board
10 cm minimum from the wall
Sleeve (sold separately)
② Wireless remote control
③ Remote control holder
⑤ Wood screws

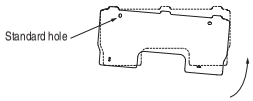
# INSTALLATION OF INDOOR UNIT

### Installation of Installation board

Look for the inside wall structures (Intersediats support or pillar and finally install the unit after level surface has been checked.)

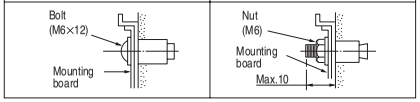



○Adjustment of the installation board in the horizontal direction is to be conducted with four screws in a temporary tightened state.



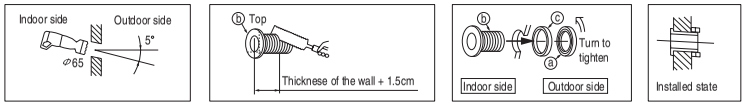

○Adjust so the board will be level by turning the board with the standard hole as the center.

| Fixing on concrete wall | |
|---|---|
| Use of nut anchor | Use of bolt anchor |



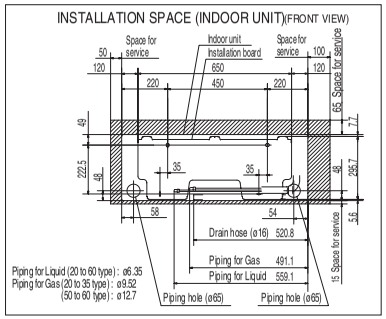

### Drilling of holes and fixture of sleeve (Option parts)

When drilling the wall that contains a metal lath, wire lath or metal plate, be sure to use pipe hole sleeve sold separately.




○ Drill a hole with whole core drill.
○ In case of rear piping draw out, cut off the lower and the right side portions of the sleeve collar.

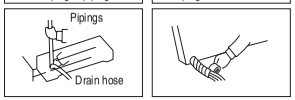
### Relation between setting plate and indoor unit


INSTALLATION SPACE (INDOOR UNIT)(FRONT VIEW)
Space for service
Indoor unit
Installation board
Space for service
Space for service
Drain hose (ø16) 520.8
Piping for Gas 491.1
Piping for Liquid 559.1
Piping for Liquid (20 to 60 type) : ø6.35
Piping for Gas (20 to 35 type) : ø9.52
(50 to 60 type) : ø12.7
Piping hole (ø65)
Piping hole (ø65)

### Installing the support of piping

#### In case of piping in the right rear direction

| Shaping of pipings | Taping of the exterior |
|---|---|




○ Hold the bottom of the piping and fix direction before stretching it and shaping it.
○ Tape only the portion that goes through the wall.
○ Always tape the wiring with the piping.

● Matters of special notice when piping from left or central/rear of tha unit.

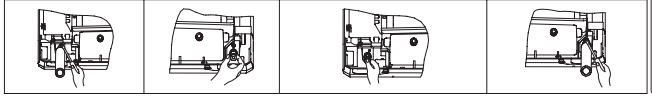
[Top view]

| Left-hand-side piping | Right-hand-side piping |
|---|---|

Piping in the left rear direction
Piping in the left direction
Piping in the right rear direction
Piping in the right direction

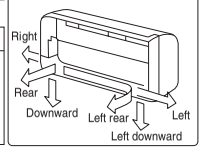
[Drain hose changing procedures]

| 1. Remove the drain hose. | 2. Remove the drain cap. | 3. Insert the drain cap. | 4. Connect the drain hose. |
|---|---|---|---|

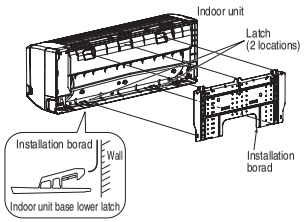


○ Remove the screw and drain hose, making it rotate.
○ Remove it with hand or pilers.
○ Insert the drain cap which was removed at procedure "2" securely using a hexagonal wrench etc.
Note: Be careful that If it is not Inserted securely, water leakage may occur.
○ Insert the drain hose securely, making rotate. And install the screw.
Note: Be careful that If it is not Inserted securely, water leakage may occur.

Piping is possible in the rear, left, left rear, left downward, right or downward direction.



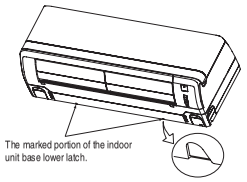
## Fixing of indoor unit



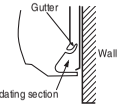

| Installation Steps |
|---|
| ①Pass the pipe through the hole in the wall, and hook the upper part of the indoor unit to the installation board. |
| ②Gently push the lower part to secure the unit. |

● How to remove the indoor unit from the installation board

① Push up at the marked portion of the indoor unit base lower latch, and slightly pull it toward you. (both right and left hand sides) (The indoor unit base lower latch can be removed from the installation board)
② Push up the indoor unit upward. So the indoor unit will be removed from the installation board.



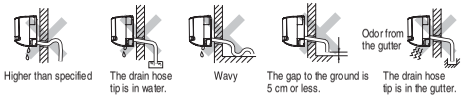

Since this air conditioner has been designed to collect dew drops on the rear surface to the drain pan, do not attach the power cord above the gutter.



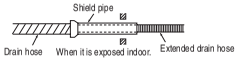

## Drainage

○ Arrange the drain hose in a downward angle
○ Avoid the following drain piping.

⚠CAUTION Go through all installation steps and check if the drainage is all right. Otherwise water leak may occur.


Higher than specified
The drain hose tip is in water.
Wavy
The gap to the ground is 5 cm or less.
Odor from the gutter
The drain hose tip is in the gutter.

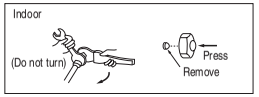
○ Pour water to the drain pan located under the heat exchanger, and ensure that the water is discharged outdoor.
○ When the extended drain hose is indoor, always use a shield pipe (to be arranged by the user) and ensure it is thermally insulated



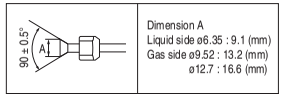

# CONNECTION OF REFRIGERANT PIPINGS

## Preparation

Keep the openings of the pipes covered with tapes etc. to prevent dust, sand, etc. from entering them.




○ Remove the flared nuts. (on both liquid and gas sides)

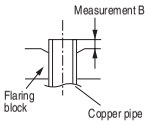



Dimension A
Liquid side ø6.35 : 9.1 (mm)
Gas side ø9.52 : 13.2 (mm)
ø12.7 : 16.6 (mm)

○ Install the removed flared nuts to the pipes to be connected, then flared the pipes.

⚠CAUTION
Do not apply refrigerating machine oil to the flared surface.

● Flaring work

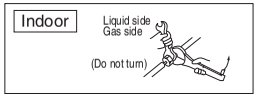



| Copper pipe diameter | Measurement B (mm) | | |
|---|---|---|---|
| | Clutch type flare tool for R410A | Conventional (R22) flare tool | |
| | | Clutch type | Wing nut type |
| ø6.35 | 0.0 - 0.5 | 1.0 - 1.5 | 1.5 - 2.0 |
| ø9.52 | 0.0 - 0.5 | 1.0 - 1.5 | 1.5 - 2.0 |
| ø12.7 | 0.0 - 0.5 | 1.0 - 1.5 | 2.0 - 2.5 |

Use a flare tool designed for R410A or a conventional flare tool.
Please note that measurement B (protrusion from the flaring block) will vary depending on the type of a flare tool in use.
If a coventional flare tool is used, please use a copper pipe gauge or a similar instrument to check protrusion so that you can keep measurement B to a correct value.

⚠CAUTION
Do not apply excess torque to the flared nuts. Otherwise, the flared nuts may checkdepending.

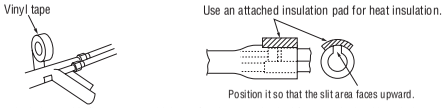
## Connection




○ Connect the pipes on both liquid and gas sides.
○ Tighten the nuts to the following torque.
Liquid side (ø6.35) : 14.0 - 18.0 N·m (1.4 - 1.8 kgf·m)
Gas side (ø9.52) : 34.0 - 42.0 N·m (3.4 - 4.2 kgf·m)
(ø12.7) : 49.0 - 61.0 N·m (4.9 - 6.1 kgf·m)

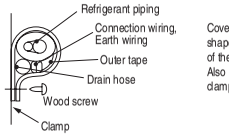
## Insulation of the connection portion

Cover the coupling with insulator and then cover it with tapes.




● Cover the indoor unit's flare-connected joints, after they are checked for a gas leak, with an indoor unit heat insulating material and then wrap them with a tape with an attached insulation pad placed over the heat insulating material's slit area.

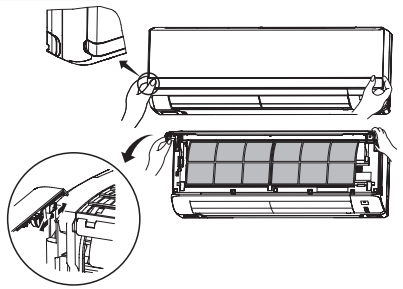
## Finishing work and fixing




Cover the exterior portion with outer tape and shape the piping so it will match the contours of the route that the piping to take.
Also fix the wiring and pipings to the wall with clamps.

## Open/close and detachment/attachment of the air inlet panel

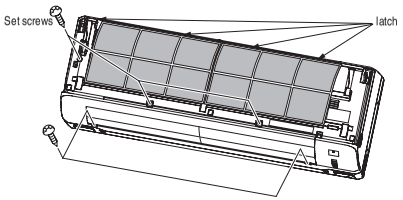
○ To open, pull the panel at both ends of lower part and release latches, then pull up the panel until you feel resistance.
(The panel stops at approx. 60° open position)
○ To close, hold the panel at both ends of lower part to lower downward and push it slightly until the latch works.
○ To remove, pull up the panel to the position shown in right illustration and pull it toward you.
○ To install, insert the panel arm into the slot on the front panel from the position shown in right illustration, hold the panel at both ends of lower part, lower it downward slowly, then push it slightly until the latch warks.



## How to remove and fit the front panel

○ Removing
① Remove the air inlet panel.
② Remove the 5 set screws.
③ Remove the 4 latches in the upper section.
④ Move the lower part of the panel forward and push upwards to remove.

○ Fitting
① Do remove the air filter.
② Cover the body with the front panel.
③ Fit the 4 latches in the upper section.
④ Tighten the 5 set screws.
⑤ Fit the air filter.
⑥ Fit the air input panel.



# ELECTRICAL WIRING WORK

## Preparation of indoor unit

### Mounting of connecting wires

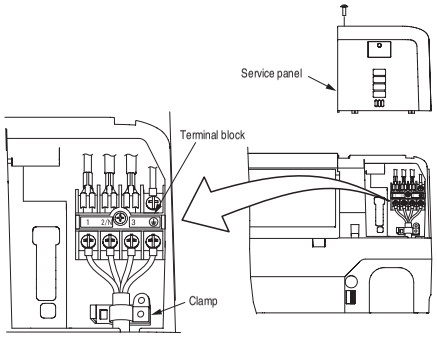
① Open the air inlet panel.
② Remove the service panel.
③ Remove the wiring clamp
④ Connect the connecting wire securely to the terminal block.
  1) Connect the connection wire securely to the terminal block. If the wire is not affixed completely, contact will be poor, and it is dangerous as the terminal block may heat up and catch fire.
  2) Take care not to confuse the terminal numbers for indoor and outdoor connections.
  3) Fix the connection wire using the wiring clamp.
⑤ Fix the connecting wire by wiring clamp.
⑥ Attach the service panel.
⑦ Close the air inlet panel.

**⚠ CAUTION**

In case of faulty wiring connection, the indoor unit stops, and then the run lamp turns on and the timer lamp blinks.

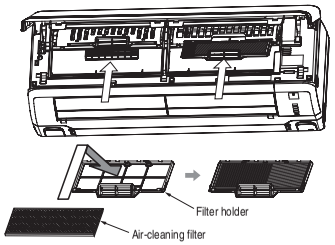
Use cables for interconnection wiring to avoid loosening of the wires.
CENELEC code for cables Required field cables.

| | |
|---|---|
| H05 | RNR4G1.5 (example) or 245IEC57 |
| H | Harmonized cable type |
| 05 | 300/500 volts |
| R | Natural-and/or synth, rubber wire insulation |
| N | Polychloroprene rubber conductors insulation |
| R | Stranded core |
| 4or5 | Number of conductors |
| G | One conductor of the cable is the earth conductor (yellow/green) |
| 1.5 | Section of copper wire (mm²) |




## Installing the air-cleaning filters

1. Open the air inlet panel and remove the air filters.
2. Install the filter holders, with the air-cleaning filters installed in the holders.
   In the air conditioner.
   • Each air-cleaning filter can be installed in the left or right filter holder.
3. Install the air filters and close the inlet panel.



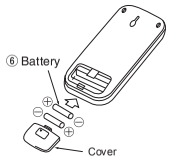

# INSTALLATION OF REMOTE CONTROL SWITCH

## Mounting method of battery

○Uncover the wireless remote control, and mount the batteries [R03(AAA,Micro),×2 pieces] in the body regularly.
(Fit the poles with the indication marks, ⊕ & ⊖ without fall)

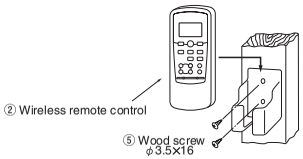
**⚠ CAUTION**

Do not use new and old batteries together.




## Fixing to pillar or wall

○Conventionally, operate the remote control switch by holding in your hand.
○Avoid installing it on a clay wall etc.




# INSTALLATION TEST CHECK POINTS

Check the following points again after completion of the installation, and before turning on the power. Conduct a test run again and ensure that the unit operates properly. At the same time, explain to the customer how to use the unit and how to take care of the unit following the user's manual.

**After installation**

☐ The power supply voltage is correct as the rating.
☐ No gas leaks from the joints of the operational valve.
☐ Power cables and crossover wires are securely fixed to the terminal board.
☐ Operational valve is fully open.
☐ The pipe joints for indoor and outdoor pipes have been insulated.

**Test run**

☐ Air conditioning operation is normal.
☐ No abnormal noise.
☐ Water drains smoothly.
☐ Protective functions are not working.
☐ The remote control is normal.
☐ Operation of the unit has been explained to the customer.
(Three-minutes restart preventive timer)
When the air conditioner is restarted or when changing the operation, the unit will not start operating for approximately 3 minutes.
This is to protect the unit and it is not a malfunction.

# HOW TO RELOCATE OR DISPOSE OF THE UNIT

○ In order to protect the environment, be sure to pump down (recovery of refrigerant).
○ Pump down is the method of recovering refrigerant from the indoor unit to the outdoor unit when the pipes are removed from the unit.

<How to pump down>
① Connect charge hose to service port of outdoor unit.
② Liquid side : Close the liquid valve with hexagon wrench key.
  Gas side : Fully open the gas valve
  Carry out cooling operation . (If indoor temperature is low, operate forced cooling operation.)
③ After low pressure gauge become 0.01MPa, stop cooling operation and close the gas valve.

● Forced cooling operation
Turn on a power supply again after a while after turn off a power supply.
Then press continually the ON/OFF button 5 seconds or more.

# CONCERNING TERMINAL CONNECTION FOR AN INTERFACE

① Remove the front panel and lid of control.
② There is a terminal (respectively marked with CNS) for the indoor control board.
In connecting an interface, connect to the respective terminal securely with the connection harness supplied with an optional "Interface connection kit SC-BIKN-E" and fasten the connection harness onto the indoor control box with the clamp supplied with the kit.
For more details, please refer to the user's manual of your "Interface connection kit SC-BIKN-E".

PJA012D729A A

## 5.2 Instullation of wired remote controller

Read together with indoor unit's installation manual.

**⚠WARNING**

- Fasten the wiring to the terminal securely and hold the cable securely so as not to apply unexpected stress on the terminal.
  Loose connection or hold will cause abnormal heat generation or fire.
- Make sure the power supply is turned off when electric wiring work.
  Otherwise, electric shock, malfunction and improper running may occur.

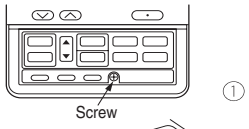
**⚠CAUTION**

- DO NOT install the remote controller at the following places in order to avoid malfunction.
  (1) Places exposed to direct sunlight
  (2) Places near heat devices
  (3) High humidity places
  (4) Hot surface or cold surface enough to generate condensation
  (5) Places exposed to oil mist or steam directly
  (6) Uneven surface
- DO NOT leave the remote controller without the upper case.
  In case the upper cace needs to be detached, protect the remote controller with a packaging box or bag in order to keep it away from water and dust.

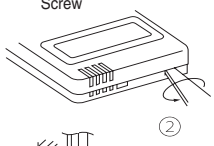
| | |
|---|---|
| Accessories | Remote controller, wood screw (ø3.5×16) 2 pieces |
| Prepare on site | Remote controller cord (2 cores) the insulated thickness in 1mm or more.<br>[In case of embedding cord] Erectrical box, M4 screw (2 pieces)<br>[In case of exposing cord] Cord clamp (if needed) |

**Installation procedure**

① Open the cover of remote controller , and remove the screw under the buttons without fail.

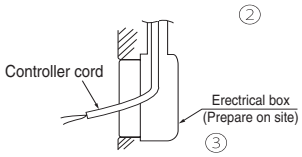



② Remove the upper case of remote controller.
Insert a flat-blade screwdriver into the dented part of the upper part of the remote controller, and wrench slightly.

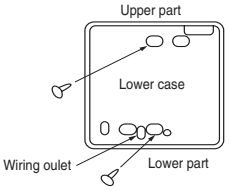


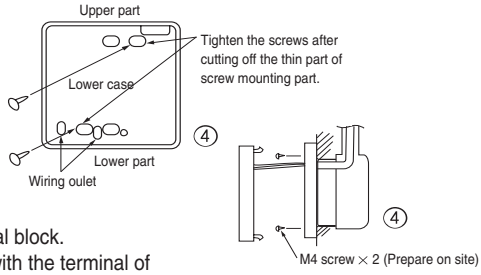

**[In case of embedding cord]**

③ Embed the erectrical box and remote controller cord beforehand.



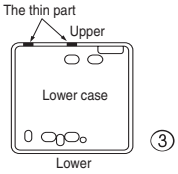

④ Prepare two M4 screws (recommended length is 12-16mm) on site, and install the lower case to erectrical box.
Choose either of the following two positions in fixing it with screws.




⑤ Connect the remote controller cord to the terminal block.
Connect the terminal of remote controller (X,Y) with the terminal of indoor unit (X,Y). (X and Y are no polarity)

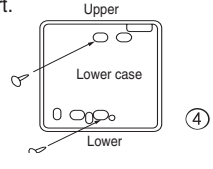
⑥ Install the upper case as before so as not to catch up the remote controller cord, and tighten with the screws.



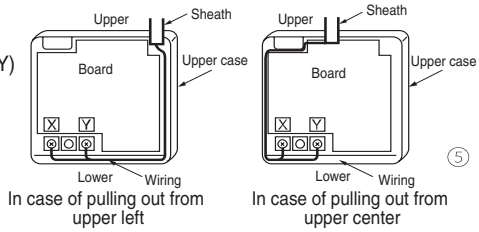

**[In case of exposing cord]**

③ You can pull out the remote controller cord from left upper part or center upper part.
Cut off the upper thin part of remote controller lower case with a nipper or knife, and grind burrs with a file etc.

④ Install the lower case to the flat wall with attached two wooden screws.

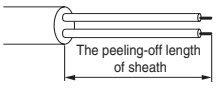


⑤ Connect the remote controller cord to the terminal block.
Connect the terminal of remote controller (X,Y) with the terminal of indoor unit (X,Y).
(X and Y are no polarity)
Wiring route is as shown in the right diagram depending on the pulling out direction.




The wiring inside the remote controller case should be within 0.3mm$^2$ (recommended) to 0.5mm$^2$.
The sheath should be peeled off inside the remote controller case.
The peeling-off length of each wire is as below.

| Pulling out from upper left | Pulling out from upper center |
|---|---|
| X wiring : 215mm<br>Y wiring : 195mm | X wiring : 170mm<br>Y wiring : 190mm |




⑥ Install the upper case as before so as not to catch up the remote controller cord, and tighten with the screws.
⑦ In case of exposing cord, fix the cord on the wall with cord clamp so as not to slack.

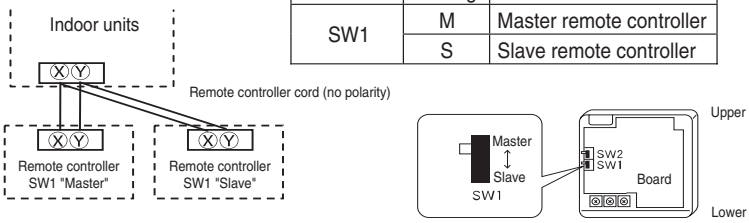
**Installation and wiring of remote controller**

① Wiring of remote controller should use 0.3mm$^2$ × 2 core wires or cables. (on-site configuration)
② Maximum prolongation of remote controller wiring is 600 m.
If the prolongation is over 100m, change to the size below.
But, wiring in the remote controller case should be under 0.5mm$^2$ . Change the wire size outside of the case according to wire connecting. Waterproof treatment is necessary at the wire connecting section. Be careful about contact failure.
100 - 200m·····0.5mm$^2$ × 2 cores
Under 300m·····0.75mm$^2$ × 2 cores
Under 400m·····1.25mm$^2$ × 2 cores
Under 600m·····2.0mm$^2$ × 2 cores

**Master/ slave setting when more than one remote controllers are used**

A maximum of two remote controllers can be connected to one indoor unit (or one group of indoor units.)

| Switch | Setting | Contents |
|---|---|---|
| SW1 | M | Master remote controller |
| | S | Slave remote controller |

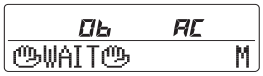



Set SW1 to "Slave" for the slave remote controller. It was factory set to "Master" for shipment.
Note: The setting "Remote controller thermistor enabled" is only selectable with the master remote controller in the position where you want to check room temperature.
The air conditioner operation follows the last operation of the remote controller regardless of the master/ slave setting of it.

**The indication when power source is supplied**

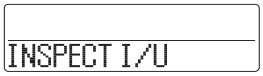
When power source is turned on, the following is displayed on the remote controller until the communication between the remote controller and indoor unit settled.
Master remote controller : "WAIT M"
Slave remote controller : "WAIT S"

At the same time, a mark or a number will be displayed for two seconds first.
This is the software's administration number of the remote controller, not an error cord.




※ The left mark is only an example. Other marks may appear.

When remote controller cannot communicate with the indoor unit for half an hour, the below indication will appear.
Check wiring of the indoor unit and the outdoor unit etc.



**The range of temperature setting**

When shipped, the range of set temperature differs depending on the operation mode as below.

Heating : 16~30˚C (55~86˚F)

Except heating (cooling, fan, dry, automatic) : 18~30˚C (62~86˚F)

**●Upper limit and lower limit of set temperature can be changed with remote controller.**

Upper limit setting: valid during heating operation. Possible to set in the range of 20 to 30˚C (68 to 86˚F).

Lower limit setting: valid except heating (automatic, cooling, fan, dry) Possible to set in the range of 18 to 26˚C (62 to 79˚F).

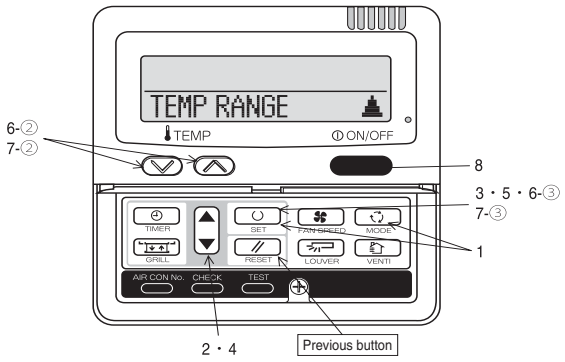
When you set upper and lower limit by this function, control as below.

1. When ⑫TEMP RANGE SET, remote controller function of function setting mode is "INDN CHANGE" (factory setting),
   【If upper limit value is set】
   During heating, you cannot set the value exceeding the upper limit.
   【If lower limit value is set 】
   During operation mode except heating, you cannot set the value below the lower limit.
2. When ⑫TEMP RANGE SET, remote controller function of function setting mode is "NO INDN CHANGE"
   【If upper limit value is set】
   During heating, even if the value exceeding the upper limit is set, upper limit value will be sent to the indoor unit. But, the indication is the same as the temperature set.
   【If lower limit value is set 】
   During except heating, even if the value lower than the lower limit is set, lower limit value will be sent to the indoor unit. But, the indication is the same as the temperature set.

**●How to set upper and lower limit value**

1. Stop the air-conditioner, and press (SET) and (MODE) button at the same time for over three seconds .
   The indication changes to "FUNCTION SET ▼".
2. Press ▼ button once, and change to the "TEMP RANGE ▲ " indication.
3. Press (SET) button, and enter the temperature range setting mode.
4. Select "UPPER LIMIT ▼" or "LOWER LIMIT ▲" by using ▲ ▼ button.
5. Press (SET) button to fix.
6. When "UPPER LIMIT ▼" is selected (valid during heating)
   ① Indication: "☝ ∨ ∧ SET UP" → "UPPER 30˚C ∨"
   ② Select the upper limit value with temperature setting button ∨ ∧. Indication example: "UPPER 26˚C ∨ ∧" (blinking)
   ③ Press (SET) button to fix. Indication example: "UPPER 26˚C" (Displayed for two seconds)
   After the fixed upper limit value displayed for two seconds, the indication will return to "UPPER LIMIT ▼".
7. When "LOWER LIMIT ▲" is selected (valid during cooling, dry, fan, automatic)
   ① Indication: "☝ ∨ ∧ SET UP" → "LOWER 18˚C ∧"
   ② Select the lower limit value with temperature setting button ∨ ∧. Indication example: "LOWER 24˚C ∨ ∧" (blinking)
   ③ Press (SET) button to fix. Indication for example: "LOWER 24˚C" (Displayed for two seconds)
   After the fixed lower limit value displayed for two seconds, the indication will return to "LOWER LIMIT ▼".
8. Press ON/OFF button to finish.

- It is possible to finish by pressing ON/OFF button on the way, but unfinished change of setting is unavailable.
- During setting, if you press (RESET) button, you return to the previous screen.



## The functional setting

●The initial function setting for typical using is performed automatically by the indoor unit connected, when remote controller and indoor unit are connected.
As long as they are used in a typical manner, there wiil be no need to change the initial settings.
If you would like to change the initial setting marked "○", set your desired setting as for the selected item.
The procedure of functional setting is shown as the following diagram.

### [Flow of function setting]

Start : Stop air-conditioner and press "(SET)" (SET) and "(MODE)" (MODE) buttons at the same time for over three seconds.
Finalize : Press "(SET)" (SET) button.
Reset : Press "(RESET)" (RESET) button.
Select : Press ▲ ▼ button.
End : Press ON/OFF button.
It is possible to finish above setting on the way, and unfinished change of setting is unavailable.
"○" : Initial settings
"※" : Automatic criterion

Record and keep the setting

Consult the technical data etc. for each control details

Stop air-conditioner and press (SET) + (MODE) buttons at the same time for over three seconds.

FUNCTION SET ▼

FUNCTION ▼ (Remote controller function)

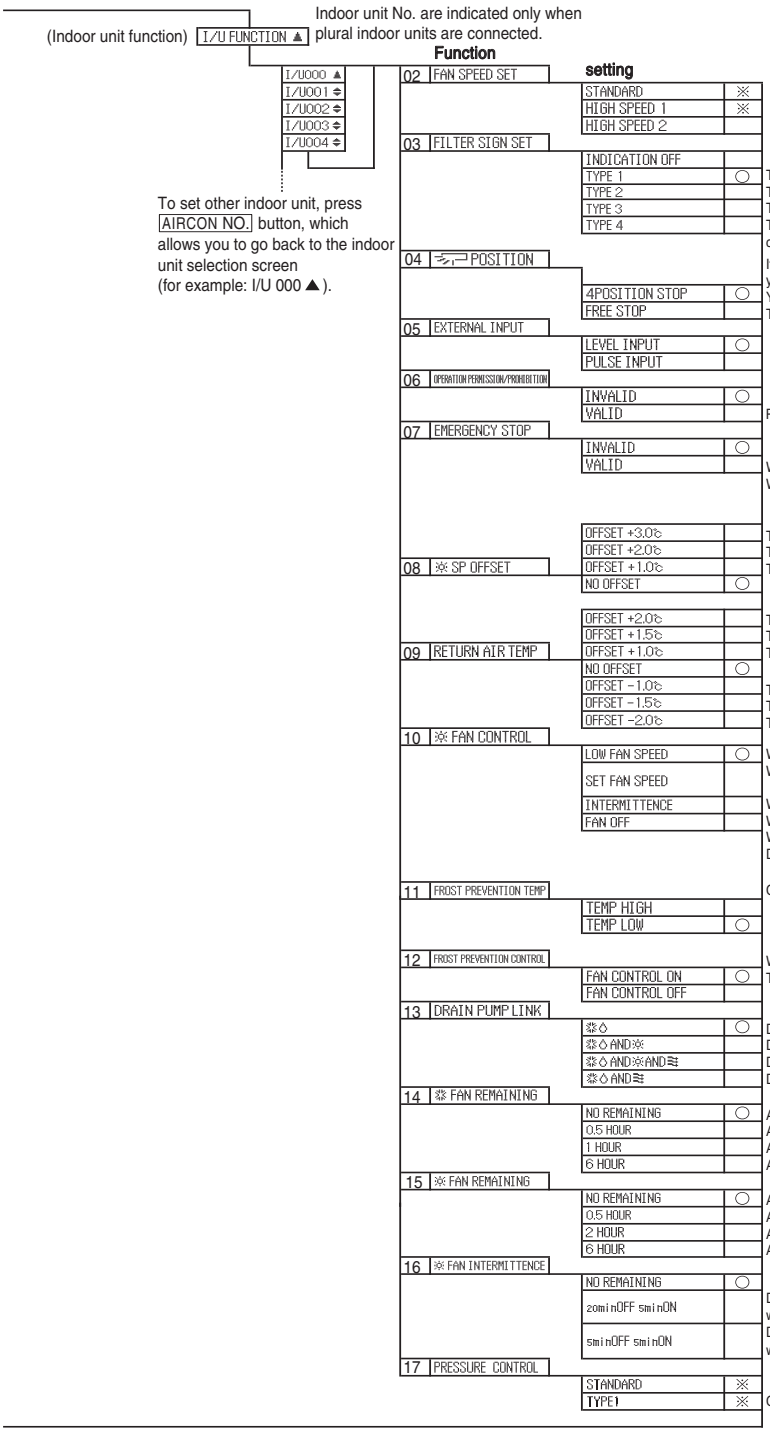
| | Function | setting | | |
|---|---|---|---|---|
| 01 | GRILLE ↑↓ SET | | | |
| | | ↑↓ INVALID | ○ | |
| | | 50Hz ZONE ONLY | | When you use at 50Hz area |
| | | 60Hz ZONE ONLY | | When you use at 60Hz area |
| 02 | AUTO RUN SET | | | |
| | | AUTO RUN ON | ※ | |
| | | AUTO RUN OFF | ※ | Automatical operation is impossible |
| 03 | TEMP SW | | | |
| | | VALID | ○ | |
| | | INVALID | | Temperature setting button is not working |
| 04 | MODE SW | | | |
| | | VALID | ○ | |
| | | INVALID | | Mode button is not working |
| 05 | ON/OFF SW | | | |
| | | VALID | ○ | |
| | | INVALID | | On/Off button is not working |
| 06 | FAN SPEED SW | | | |
| | | VALID | ※ | |
| | | INVALID | ※ | Fan speed button is not working |
| 07 | LOUVER SW | | | |
| | | VALID | ※ | |
| | | INVALID | ※ | Louver button is not working |
| 08 | TIMER SW | | | |
| | | VALID | ○ | |
| | | INVALID | | Timer button is not working |
| 09 | SENSOR SET | | | |
| | | SENSOR OFF | ○ | Remote thermistor is not working. |
| | | SENSOR ON | | Remote thermistor is working. |
| | | SENSOR +3.0℃ | | Remote thermistor is working, and to be set for producing +3.0˚C increase in temperature. |
| | | SENSOR +2.0℃ | | Remote thermistor is working, and to be set for producing +2.0˚C increase in temperature. |
| | | SENSOR +1.0℃ | | Remote thermistor is working, and to be set for producing +1.0˚C increase in temperature. |
| | | SENSOR -1.0℃ | | Remote thermistor is working, and to be set for producing -1.0˚C increase in temperature. |
| | | SENSOR -2.0℃ | | Remote thermistor is working, and to be set for producing -2.0˚C increase in temperature. |
| | | SENSOR -3.0℃ | | Remote thermistor is working, and to be set for producing -3.0˚C increase in temperature. |
| 10 | AUTO RESTART | | | |
| | | INVALID | ○ | |
| | | VALID | | |
| 11 | VENT LINK SET | | | |
| | | NO VENT | ○ | |
| | | VENT LINK | | In case of Single split series, by connecting ventilation device to CNT of the indoor printed circuit board (in case of VRF series, by connecting it to CND of the indoor printed circuit board), the operation of ventilation device is linked with the operation of indoor unit. |
| | | NO VENT LINK | | In case of Single split series, by connecting ventilation device to CNT of the indoor printed circuit board (in case of VRF series, by connecting it to CND of the indoor printed circuit board), you can operate /stop the ventilation device independently by (VENT) button. |
| 12 | TEMP RANGE SET | | | |
| | | INDN CHANGE | ○ | If you change the range of set temperature, the indication of set temperature will vary following the control. |
| | | NO INDN CHANGE | | If you change the range of set temperature, the indication of set temperature will not vary following the control, and keep the set temperature. |
| 13 | I/U FAN | | | |
| | | HI-MID-LO | ※ | Airflow of fan becomes the three speed of ※-※-※ or ※-※-※-※. |
| | | HI-LO | ※ | Airflow of fan becomes the two speed of ※-※. |
| | | HI-MID | | Airflow of fan becomes the two speed of ※-※. |
| | | 1 FAN SPEED | ※ | Airflow of fan is fixed at one speed. |
| 14 | POSITION | | | If you change the remote controller function "14 POSITION", you must change the indoor function "04 POSITION" accordingly. |
| | | 4POSITION STOP | ○ | You can select the louver stop position in the four. |
| | | FREE STOP | | The louver can stop at any position. |
| 15 | MODEL TYPE | | | |
| | | HEAT PUMP | ※ | |
| | | COOLING ONLY | ※ | |
| 16 | EXTERNAL CONTROL SET | | | |
| | | INDIVIDUAL | ○ | If you input signal into CNT of the indoor printed circuit board from external, the indoor unit will be operated independently according to the input from external. |
| | | FOR ALL UNITS | | If you input into CNT of the indoor printed circuit board from external, all units which connect to the same remote controller are operated according to the input from external. |
| 17 | ROOM TEMP INDICATION SET | | | |
| | | INDICATION OFF | ○ | |
| | | INDICATION ON | | In normal working indication, indoor unit temperature is indicated instead of airflow. (Only the master remote controller can be indicated.) |
| 18 | ※ INDICATION | | | |
| | | INDICATION ON | ○ | |
| | | INDICATION OFF | | Heating preparation indication should not be indicated. |
| 19 | ℃/℉ SET | | | |
| | | ℃ | ○ | Temperature indication is by degree C |
| | | ℉ | | Temperature indication is by degree F |

ON/OFF button (finished)

Note 1: The initial setting marked "※" is decided by connected indoor and outdoor unit, and is automatically defined as following table.

| Function No. | Item | Default | Model |
|---|---|---|---|
| Remote controller function02 | AUTO RUN SET | AUTO RUN ON | "Auto-RUN" mode selectable indoor unit. |
| | | AUTO RUN OFF | Indoor unit without "Auto-RUN" mode |
| Remote controller function06 | FAN SPEED SW | VALID | Indoor unit with two or three step of air flow setting |
| | | INVALID | Indoor unit with only one of air flow setting |
| Remote controller function07 | LOUVER SW | VALID | Indoor unit with automatically swing louver |
| | | INVALID | Indoor unit without automatically swing louver |
| Remote controller function13 | I/U FAN | HI-MID-LO | Indoor unit with three step of air flow setting |
| | | HI-LO | Indoor unit with two step of air flow setting |
| | | HI-MID | |
| | | 1 FAN SPEED | Indoor unit with only one of air flow setting |
| Remote controller function15 | MODEL TYPE | HEAT PUMP | Heat pump unit |
| | | COOLING ONLY | Exclusive cooling unit |

Note 3: As for plural indoor unit, set indoor functions to each master and slave indoor unit.
But only master indoor unit is received the setting change of indoor unit function "05 EXTERNAL INPUT" and "06 PERMISSION / PROHIBISHION".




The filter sign is indicated after running for 180 hours.
The filter sign is indicated after running for 600 hours.
The filter sign is indicated after running for 1000 hours.
The filter sign is indicated after running for 1000 hours, then the indoor unit will be stopped by compulsion after 24 hours.

If you change the indoor function "04 ⇄ POSITION", you must change the remote controller function "14 ⇄ POSITION" accordingly.
You can select the louver stop position in the four.
The louver can stop at any position.

Permission/prohibition control of operation will be valid.

With the VRF series, it is used to stop all indoor units connected with the same outdoor unit immediately.
When stop signal is inputed from remote on-off terminal "CNT-6", all indoor units are stopped immediately.

To be reset for producing +3.0˚C increase in temperature during heating.
To be reset for producing +2.0˚C increase in temperature during heating.
To be reset for producing +1.0˚C increase in temperature during heating.

To be reset producing +2.0˚C increase in return air temperature of indoor unit.
To be reset producing +1.5˚C increase in return air temperature of indoor unit.
To be reset producing +1.0˚C increase in return air temperature of indoor unit.
To be reset producing -1.0˚C increase in return air temperature of indoor unit.
To be reset producing -1.5˚C increase in return air temperature of indoor unit.
To be reset producing -2.0˚C increase in return air temperature of indoor unit.

When heating thermostat is OFF, fan speed is low speed.
When heating thermostat is OFF, fan speed is set speed.
When heating thermostat is OFF, fan speed is operated intermittently.
When heating thermostat is OFF, the fan is stopped.
When the remote thermistor is working, "FAN OFF" is set automatically.
Do not set "FAN OFF" when the indoor unit's thermistor is working.

Change of indoor heat exchanger temperature to start frost prevention control.

Working only with the Single split series.
To control frost prevention, the indoor fan tap is raised.

Drain pump is run during cooling and dry.
Drain pump is run during cooling, dry and heating.
Drain pump is run during cooling, dry, heating and fan.
Drain pump is run during cooling, dry and fan.

After cooling is stopped or cooling thermostat is OFF, the fan does not perform extra operation.
After cooling is stopped or cooling thermostat is OFF, the fan perform extra operation for half an hour.
After cooling is stopped or cooling thermostat is OFF, the fan perform extra operation for an hour.
After cooling is stopped or cooling thermostat is OFF, the fan perform extra operation for six hours.

After heating is stopped or heating thermostat is OFF, the fan does not perform extra operation.
After heating is stopped or heating thermostat is OFF,the fan perform extra operation for half an hour.
After heating is stopped or heating thermostat is OFF,the fan perform extra operation for two hours.
After heating is stopped or heating thermostat is OFF, the fan perform extra operation for six hours.

During heating is stopped or heating thermostat is OFF, the fan perform intermittent operation for five minutes with low fan speed after twenty minutes' OFF.
During heating is stopped or heating thermostat is OFF, the fan perform intermittent operation for five minutes with low fan speed after five minutes' OFF.

Connected "OA Processing" type indoor unit, and is automatically defined.

Note2: Fan setting of "HIGH SPEED"

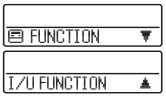
| Fan tap | | Indoor unit air flow setting | | | |
|---|---|---|---|---|---|
| | | ❄▪▪▪ - ❄▪▪▪ - ❄▪▪▫ - ❄▪▫▫ | ❄▪▪▪ - ❄▪▪▫ - ❄▪▫▫ | ❄▪▪▪ - ❄▪▫▫ | ❄▪▪▪ - ❄▪▪▫ |
| FAN SPEED SET | STANDARD | UH - Hi - Me - Lo | Hi - Me - Lo | Hi - Lo | Hi - Me |
| | HIGH SPEED1, 2 | UH - UH - Hi - Me | UH - Hi - Me | UH - Me | UH - Hi |

Initial function setting of some indoor unit is "HIGH SPEED".

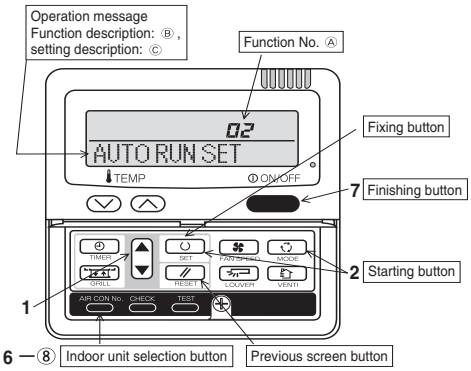
## How to set function

1. **Stop air-conditioner and press (SET) (MODE) buttons at the same time for over three seconds, and the "FUNCTION SET ▼" will be displayed.**

2. **Press (SET) button.**
3. **Make sure which do you want to set, "FUNCTION ▼" (remote controller function) or "I/U FUNCTION ▲" (indoor unit function).**
4. **Press ▲ or ▼ button.**
   Selecct "FUNCTION ▼" (remote controller function) or "I/U FUNCTION ▲" (indoor unit function).



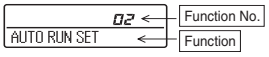

5. **Press (SET) button.**



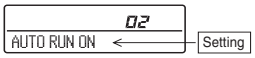

6. **【On the occasion of remote controller function selection】**

① "DATA LOADING" (Indication with blinking)
↓
Display is changed to "01 GRILLE ↑↓SET".

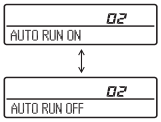
② Press ▲ or ▼ button.
"No. and function"are indicated by turns on the remote controller function table, then you can select from them.
(For example)




③ Press (SET) button.
The current setting of selected function is indicated.
(for example) "AUTO RUN ON" ← If "02 AUTO RUN SET" is selected




④ Press ▲ or ▼ button.
Select the setting.




⑤ Press (SET)
"SET COMPLETE" will be indicated, and the setting will be completed.
Then after "No. and function" indication returns, Set as the same procedure if you want to set continuously ,and if to finish, go to 7.

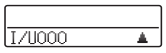
7. **Press ON/OFF button.**
   Setting is finished.

**【On the occasion of indoor unit function selection】**

① "DATA LOADING" (Blinking for 2 to 23 seconds to read the data)
↓
Indication is changed to "02 FAN SPEED SET".
Go to ②.

**[Note]**

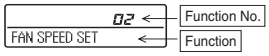
(1) If plural indoor units are connected to a remote controller, the indication is "I/U 000" (blinking) ← The lowest number of the indoor unit connected is indicated.



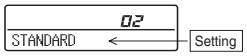

(2) Press ▲ or ▼ button.
Select the number of the indoor unit you are to set
If you select "ALL UNIT ▼", you can set the same setting with all unites.

(3) Press (SET) button.

② Press ▲ or ▼ button.
"No. and function" are indicated by turns on the indoor unit function table, then you can select from them.
(For example)




③ Press (SET) button.
The current setting of selected function is indicated.
(For example) "STANDARD" ← If "02 FAN SPEED SET" is selected.




④ Press ▲ or ▼ button.
Select the setting.

⑤ Press (SET) button.
"SET COMPLETE" will be indicated, and the setting will be completed.
Then after "No. and function" indication returns, set as the same procedure if you want to set continuously , and if to finish, go to 7.

※ When plural indoor units are connected to a remote controller, press the AIRCON NO. button, which allows you to go back to the indoor unit selection screen. (example "I/U 000 ▲")

- It is possible to finish by pressing ON/OFF button on the way, but unfinished change of setting is unavailable.
- During setting, if you press (RESET) button, you return to the previous screen.
- Setting is memorized in the controller and it is saved independently of power failure.

**【How to check the current setting】**

When you select from "No. and funcion" and press set button by the previous operation, the "Setting" displayed first is the current setting.
(But, if you select "ALL UNIT ▼", the setting of the lowest number indoor unit is displayed.)

# 5.3 Instuallation of outdoor unut

PSB012D909G K

## (1) Model FDC71VNX

| |
|---|
| Inverter driven single split PAC |
| 71V |
| Designed for R410A refrigerant |

◎This installation manual deals with outdoor units and general installation specifications only. For indoor units, refer to the respective installation manuals supplied with the units.
◎When install the unit, be sure to check whether the selection of installation place, power supply specifications, usage limitation (piping length, height differences between indoor and outdoor units, power supply voltage and etc.) and installation spaces

## SAFETY PRECAUTIONS

- We recommend you to read this "SAFETY PRECAUTIONS" carefully before the installation work in order to gain full advantage of the functions of the unit and to avoid malfunction due to mishandling.
- The precautions described below are divided into ⚠WARNING and ⚠CAUTION. The matters with possibilities leading to serious consequences such as death or serious personal injury due to erroneous handling are listed in the ⚠WARNING and the matters with possibilities leading to personal injury or damage of the unit due to erroneous handling including probability leading to serious consequences in some cases are listed in ⚠CAUTION. **These are very important precautions for safety. Be sure to observe all of them without fail.**
- The meaning of "Marks" used here are as shown below.

| | | | |
|---|---|---|---|
| ⃠ | Never do it under any circumstance. | ❗ ⏚ | Always do it according to the instruction |

- Be sure to confirm no anomaly on the equipment by commissioning after completed installation and explain the operating methods as well as the maintenance methods of this equipment to the user according to the owner's manual.
- Keep the installation manual together with owner's manual at a place where any user can read at any time. Moreover if necessary, ask to hand them to a new user

## Check before installation work

- Model name and power source
- Refrigerant piping length
- Piping, wiring and miscellaneous small parts
- Indoor unit installation manual

## ⚠ WARNING

❗
- **Installation must be carried out by the qualified installer.**
  If you install the system by yourself, it may cause serious trouble such as water leaks, electric shocks, fire and personal injury, as a result of a system malfunction.
- **Install the system in full accordance with the instruction manual.**
  Incorrect installation may cause bursts, personal injury, water leaks, electric shocks and fire.
- **Use the original accessories and the specified components for installation.**
  If parts other than those prescribed by us are used, it may cause fall of the unit, water leaks, electric shocks, fire, refrigerant leak, substandard performance, control failure and personal injury.
- **When installing in small rooms, take prevention measures not to exceed the density limit of refrigerant in the event of leakage accordance with ISO5149.**
  Consult the expert about prevention measures. If the density of refrigerant exceeds the limit in the event of leakage, lack of oxygen can occur, which can cause serious accidents.
- **Ventilate the working area well in the event of refrigerant leakage during installation.**
  If the refrigerant comes into contact with naked flames, poisonous gas is produced.
- **After completed installation, check that no refrigerant leaks from the system.**
  If refrigerant leaks into the room and comes into contact with an oven or other hot surface, poisonous gas is produced.
- **Hang up the unit at the specified points with ropes which can support the weight in lifting for portage. And to avoid jolting out of alignment, be sure to hang up the unit at 4-point support.**
  An improper manner of portage such as 3-point support can cause death or serious personal injury due to falling of the unit
- **Install the unit in a location with good support.**
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- **Ensure the unit is stable when installed, so that it can withstand earthquakes and strong winds.**
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- **The electrical installation must be carried out by the qualified electrician in accordance with "the norm for electrical work" and "national wiring regulation", and the system must be connected to the dedicated circuit.**
  Power supply with insufficient capacity and incorrect function done by improper work can cause electric shocks and fire,
- **Be sure to shut off the power before starting electrical work.**
  Failure to shut off the power can cause electric shocks, unit failure or incorrect function of equipment.
- **Be sure to use the cables conformed to safety standard and cable ampacity for power distribution work.**
  Unconformable cables can cause electric leak, anomalous heat production or fire.
- **Use the prescribed cables for electrical connection, tighten the cables securely in terminal block and relieve the cables correctly to prevent overloading the terminal blocks.**
  Loose connections or cable mountings can cause anomalous heat production or fire.
- **Arrange the wiring in the control box so that it cannot be pushed up further into the box. Install the service panel correctly.**
  Incorrect installation may result in overheating and fire.

❗
- **Do not perform brazing work in the airtight room**
  It can cause lack of oxygen.
- **Use the prescribed pipes, flare nuts and tools for R410A.**
  Using existing parts (for R22 or R407C) can cause the unit failure and serious accidents due to burst of the refrigerant circuit.
- **Tighten the flare nut by using double spanners and torque wrench according to prescribed method. Be sure not to tighten the flare nut too much.**
  Loose flare connection or damage on the flare part by tightening with excess torque can cause burst or refrigerant leaks which may result in lack of oxygen.
- **Do not open the service valves for liquid line and gas line until completed refrigerant piping work, air tightness test and evacuation.**
  If the compressor is operated in state of opening service valves before completed connection of refrigerant piping work, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked into refrigerant circuit, which can cause burst or personal injury due to anomalously high pressure in the refrigerant
- **Only use prescribed optional parts. The installation must be carried out by the qualified installer.**
  If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- **Do not perform any change of protective device itself or its setup condition**
  The forced operation by short-circuiting protective device of pressure switch and temperature controller or the use of non specified component can cause fire or burst.
- **Be sure to switch off the power supply in the event of installation, inspection or servicing.**
  If the power supply is not shut off, there is a risk of electric shocks, unit failure or personal injury due to the unexpected start of fan.
- **Consult the dealer or an expert regarding removal of the unit.**
  Incorrect installation can cause water leaks, electric shocks or fire.
- **Stop the compressor before closing valve and disconnecting refrigerant pipes in case of pump down operation.**
  If disconnecting refrigerant pipes in state of opening service valves before compressor stopping, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked, which can cause burst or personal injury due to anomalously high pressure in the refrigerant circuit

⃠
- **Ensure that no air enters in the refrigerant circuit when the unit is installed and removed.**
  If air enters in the refrigerant circuit, the pressure in the refrigerant circuit becomes too high, which can cause burst and personal injury.
- **Do not run the unit with removed panels or protections**
  Touching rotating equipments, hot surfaces or high voltage parts can cause personal injury due to entrapment, burn or electric shocks.
- **Be sure to fix up the service panels.**
  Incorrect fixing can cause electric shocks or fire due to intrusion of dust or water.
- **Do not perform any repairs or modifications by yourself. Consult the dealer if the unit requires repair.**
  If you repair or modify the unit, it can cause water leaks, electric shocks or fire.

## ⚠ CAUTION

- **Carry out the electrical work for ground lead with care**
  Do not connect the ground lead to the gas line, water line, lightning conductor or telephone line's ground lead. Incorrect grounding can cause unit faults such as electric shocks due to short-circuiting. Never connect the grounding wire to a gas pipe because if gas leaks,it could cause explosion or ignition.
- **Use the circuit breaker for all pole with correct capacity.**
  Using the incorrect circuit breaker, it can cause the unit malfunction and fire.
- **Install isolator or disconnect switch on the power supply wiring in accordance with the local codes and regulations.**
  The isolator should be locked in accordanced with EN60204-1.
- **Take care when carrying the unit by hand.**
  If the unit weights more than 20kg, it must be carried by two or more persons. Do not carry by the plastic straps, always use the carry handle when carrying the unit by hand. Use gloves to minimize the risk of cuts by the aluminum fins.
- **Dispose of any packing materials correctly.**
  Any remaining packing materials can cause personal injury as it contains nails and wood. And to avoid danger of suffocation, be sure to keep the plastic wrapper away from children and to dispose after tear it up.
- **Pay attention not to damage the drain pan by weld spatter when welding work is done near the indoor unit.**
  If weld spatter entered into the indoor unit during welding work, it can cause pin-hole in drain pan and result in water leakage. To prevent such damage, keep the indoor unit in its packing or cover it.
- **Be sure to insulate the refrigerant pipes so as not to condense the ambient air moisture on them.**
  Insufficient insulation can cause condensation, which can lead to moisture damage on the ceiling, floor, furniture and any other valuables.
- **Be sure to perform air tightness test by pressurizing with nitrogen gas after completed refrigerant piping work.**
  If the density of refrigerant exceeds the limit in the event of refrigerant leakage in the small room, lack of oxygen can occur, which can cause serious accidents.
- **Perform installation work properly according to this installation manual.**
  Improper installation can cause abnormal vibrations or increased noise generation.
- **Earth leakage breaker must be installed**
  If the earth leakage breaker is not installed, it can cause fire or electric shocks.
- **Do not use any materials other than a fuse with the correct rating in the location where fuses are to be used.**
  Connecting the circuit with copper wire or other metal thread can cause unit failure and fire.
- **Do not install the unit near the location where leakage of combustible gases can occur.**
  If leaked gases accumulate around the unit, it can cause fire.
- **Do not install the unit where corrosive gas (such as sulfurous acid gas etc.) or combustible gas (such as thinner and petroleum gases) can accumulate or collect, or where volatile combustible substances are handled.**
  Corrosive gas can cause corrosion of heat exchanger, breakage of plastic parts and etc. And combustible gas can cause fire.
- **Secure a space for installation, inspection and maintenance specified in the manual.**
  Insufficient space can result in accident such as personal injury due to falling from the installation place..
- **When the outdoor unit is installed on a roof or a high place, provide permanent ladders and handrails along the access route and fences and handrails around the outdoor unit.**
  If safety facilities are not provided, it can cause personal injury due to falling from the installation place.
- **Do not install nor use the system close to the equipment that generates electromagnetic fields or high frequency harmonics**
  Equipment such as inverters, standby generators, medical high frequency equipments and telecommunication equipments can affect the system, and cause malfunctions and breakdowns. The system can also affect medical equipment and telecommunication equipment, and obstruct its function or cause jamming.
- **Do not install the outdoor unit in a location where insects and small animals can inhabit.**
  Insects and small animals can enter the electric parts and cause damage or fire. Instruct the user to keep the surroundings clean.
- **Do not use the base flame for outdoor unit which is corroded or damaged due to long periods of operation.**
  Using an old and damage base flame can cause the unit falling down and cause personal injury.
- **Do not install the unit in the locations listed below**
  - Locations where carbon fiber, metal powder or any powder is floating.
  - Locations where any substances that can affect the unit such as sulphide gas, chloride gas, acid and alkaline can occur.
  - Vehicles and ships
  - Locations where cosmetic or special sprays are often used.
  - Locations with direct exposure of oil mist and steam such as kitchen and machine plant.
  - Locations where any machines which generate high frequency harmonics are used.
  - Locations with salty atmospheres such as coastlines
  - Locations with heavy snow (If installed, be sure to provide base flame and snow hood mentioned in the manual)
  - Locations where the unit is exposed to chimney smoke
  - Locations at high altitude (more than 1000m high)
  - Locations with ammonic atmospheres
  - Locations where heat radiation from other heat source can affect the unit
  - Locations without good air circulation.
  - Locations with any obstacles which can prevent inlet and outlet air of the unit
  - Locations where short circuit of air can occur (in case of multiple units installation)
  - Locations where strong air blows against the air outlet of outdoor unit

  It can cause remarkable decrease in performance, corrosion and damage of components, malfunction and fire.
- **Do not install the outdoor unit in the locations listed below.**
  - Locations where discharged hot air or operating sound of the outdoor unit can bother neighborhood.
  - Locations where outlet air of the outdoor unit blows directly to an animal or plants. The outlet air can affect adversely to the plant etc.
  - Locations where vibration can be amplified and transmitted due to insufficient strength of structure.
  - Locations where vibration and operation sound generated by the outdoor unit can affect seriously. (on the wall or at the place near bed room)
  - Locations where an equipment affected by high harmonics is placed. (TV set or radio receiver is placed within 5m)
  - Locations where drainage cannot run off safely.

  It can affect surrounding environment and cause a claim
- **Do not use the unit for special purposes such as storing foods, cooling precision instruments and preservation of animals, plants or art.**
  It can cause the damage of the items.
- **Do not touch any buttons with wet hands**
  It can cause electric shocks
- **Do not touch any refrigerant pipes with your hands when the system is in operation.**
  During operation the refrigerant pipes become extremely hot or extremely cold depending the operating condition, and it can cause burn injury or frost injury.
- **Do not clean up the unit with water**
  It can cause electric shocks
- **Do not operate the outdoor unit with any article placed on it.**
  You may incur property damage or personal injure from a fall of the article.
- **Do not step onto the outdoor unit.**
  You may incur injury from a drop or fall.

### Notabilia as a unit designed for R410A

- Do not use any refrigerant other than R410A. R410A will rise to pressure about 1.6 times higher than that of a conventional refrigerant. A cylinder containing R410A has a pink indication mark on the top.
- A unit designed for R410A has adopted a different size indoor unit operation valve charge port and a different size check joint provided in the unit to prevent the charging of a wrong refrigerant by mistake. The processed dimension of the flared part of a refrigerant pipe and a flare nut's parallel side measurement have also been altered to raise strength against pressure. Accordingly, you are required to arrange dedicated R410A tools listed in the table on the right before installing or servicing this unit.
- Do not use a charge cylinder. The use of a charge cylinder will cause the refrigerant composition to change, which results in performance degradation.
- In charging refrigerant, always take it out from a cylinder in the liquid phase.
- All indoor units must be models designed exclusively for R410A. Check connectable indoor unit models in a catalog, etc. (A wrong indoor unit, if connected into the system, will impair proper system operation)

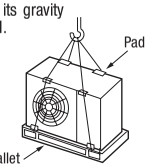
| | Dedicated R410A tools |
|---|---|
| a) | Gauge manifold |
| b) | Charge hose |
| c) | Electronic scale for refrigerant charging |
| d) | Torque wrench |
| e) | Flare tool |
| f) | Protrusion control copper pipe gauge |
| g) | Vacuum pump adapter |
| h) | Gas leak detector |

# 1. HAULAGE AND INSTALLATION (Take particular care in carrying in or moving the unit, and always perform such an operation with two or more persons.)

**⚠CAUTION** When a unit is hoisted with slings for haulage, take into consideration the offset of its gravity center position. If not properly balanced, the unit can be thrown off-balance and fall.

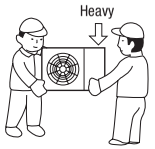
## 1) Delivery

- Deliver the unit as close as possible to the installation site before removing it from the packaging.
- When some compelling reason necessitates the unpacking of the unit before it is carried in, use nylon slings or protective wood pieces so as not to damage the unit by ropes lifting it.




## 2) Portage

- The right hand side of the unit as viewed from the front (diffuser side) is heavier. A person carrying the right hand side must take heed of this fact. A person carrying the left hand side must hold with his right hand the handle provided on the front panel of the unit and with his left hand the corner column section.



### 3) Selection of installation location for the outdoor unit

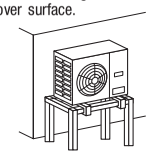
Be sure to select a suitable installation place in consideration of following conditions.

- ○ A place where it is horizontal, stable and can endure the unit weight and will not allow vibration transmittance of the unit.
- ○ A place where it can be free from possibility of bothering neighbors due to noise or exhaust air from the unit
- ○ A place where the unit is not exposed to oil splashes.
- ○ A place where it can be free from danger of flammable gas leakage.
- ○ A place where drain water can be disposed without any trouble.
- ○ A place where the unit will not be affected by heat radiation from other heat source.
- ○ A place where snow will not accumulate.
- ○ A place where the unit can be kept away 5m or more from TV set and/or radio receiver in order to avoid any radio or TV interference.
- ○ A place where good air circulation can be secured, and enough service space can be secured for maintenance and service of the unit safely.
- ○ A place where the unit will not be affected by electromagnetic waves and/or high-harmonic waves generated by other equipment.
- ○ A place where chemical substances like sulfuric gas, chloric gas, acid and alkali (including ammonia), which can harm the unit, will not be generated and not remain.
- ○ A place where strong wind will not blow against the outlet air blow of the unit.

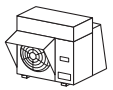
### 4) Caution about selection of installation location

(1) If the unit is installed in the area where the snow will accumulate, following measures are required.
The bottom plate of unit and intake, outlet may be blocked by snow.

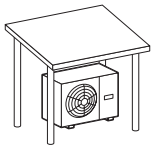
1. Install the unit on the base so that the bottom is higher than snow cover surface.



2. Provide a snow hood to the outdoor unit on site.
Regarding outline of a snow hood, refer to our technical manual.



3. Install the unit under eaves or provide the roof on site.

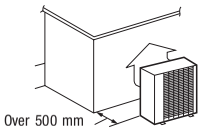


Since drain water generated by defrost control may freeze, following measures are required.

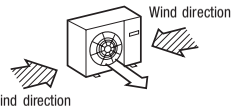
- ● Don't execute drain piping work by using a drain elbow and drain grommets (optional parts). [Refer to Drain piping work.]
- ● Recommend setting Defrost Control (SW3-1) and Snow Guard Fan Control (SW3-2). [Refer to Setting SW3-1, SW3-2.]

(2) If the unit can be affected by strong wind, following measures are required.
Strong wind can cause damage of fan (fan motor), or can cause performance degradation, or can trigger anomalous stop of the unit due to rising of high pressure.

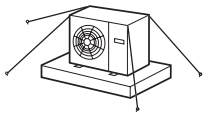
1. Install the outlet air blow side of the unit to face a wall of building, or provide a fence or a windbreak screen.




2. Install the outlet air blow side of the unit in a position perpendicular to the direction of wind.




3. The unit should be installed on the stable and level foundation. If the foundation is not level, tie down the unit with wires.

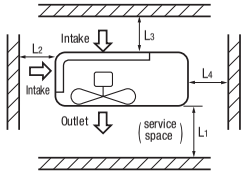


### 5) Installation space

- ● Walls surrounding the unit in the four sides are not acceptable.
- ● There must be a 1-meter or larger space in the above.
- ● When more than one unit are installed side by side, provide a 250mm or wider interval between them as a service space. In order to facilitate servicing of controllers, please provide a sufficient space between units so that their top plates can be removed easily.
- ● Where a danger of short-circuiting exists, install guide louvers.
- ● When more than one unit are installed, provide sufficient intake space consciously so that short-circuiting may not occur.
- ● Where piling snow can bury the outdoor unit, provide proper snow guards.

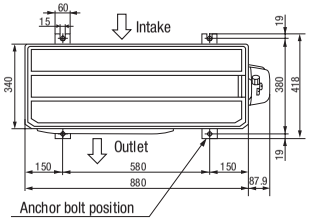
(mm)

| Size \ Example installation | 71V | | |
|---|---|---|---|
| | Ⅰ | Ⅱ | Ⅲ |
| L1 | Open | Open | 500 |
| L2 | 300 | 250 | Open |
| L3 | 100 | 150 | 100 |
| L4 | 250 | 250 | 250 |

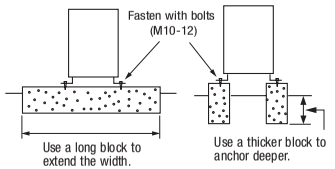



### 6) Installation

① Anchor bolt fixed position




② Notabilia for installation




- ● In installing the unit, fix the unit's legs with bolts specified on the above.
- ● The protrusion of an anchor bolt on the front side must be kept within 15 mm.
- ● Securely install the unit so that it does not fall over during earthquakes or strong winds, etc.
- ● Refer to the above illustrations for information regarding concrete foundations.
- ● Install the unit in a level area. (With a gradient of 5 mm or less.)
  Improper installation can result in a compressor failure, broken piping within the unit and abnormal noise generation.

### 7) To run the unit for a cooling operation, when the outdoor temperature is –5°C or lower.

- ● When the outdoor air temperature is -5°C or lower, provide a snow hood to the outdoor unit on site. So that strong wind will not blow against the outdoor heat exchanger directly. Regarding outline of a snow hood, refer to our technical manual.

## 2. REFRIGERANT PIPING WORK

### 1) Restrictions on unit installation and use

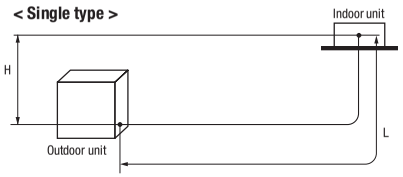
- ● Check the following points in light of the indoor unit specifications and the installation site.
- ● Observe the following restrictions on unit installation and use. Improper installation can result in a compressor failure or performance degradation.

| Restrictions | | Dimensional restrictions | Marks appearing in the drawing on the right | |
|---|---|---|---|---|
| | | | Single type | Twin type |
| One-way pipe length of refrigerant piping | Model 71V | 50m or less | L | L1+L1+L2 |
| Main pipe length | | | L | L |
| One-way pipe length after the first branching point | | 20m or less | — | L1, L2 |
| Difference of pipe length after the first branching point | | 10m or less | — | L1—L2 |
| Elevation difference between indoor and outdoor units | When the outdoor unit is positioned higher, | 30m or less | H | H |
| | When the outdoor unit is positioned lower, | 15m or less | H | H |
| Elevation difference between indoor units | | 0.5m or less | — | h |

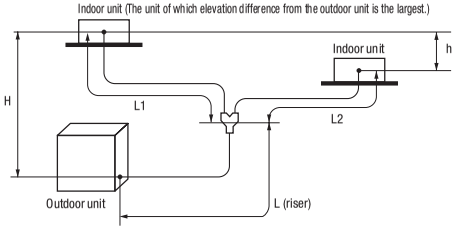
**⚠CAUTION**

- ● The use restrictions appearing in the table above are applicable to the standard pipe size combinations shown in the table below. Where an existing pipe system is utilized, different one-way pipe length restrictions should apply depending on its pipe size. For more information, please see " 6. UTILIZATION OF EXISTING PIPING."

**< Single type >**




**< Twin type >**



## 2) Determination of pipe size

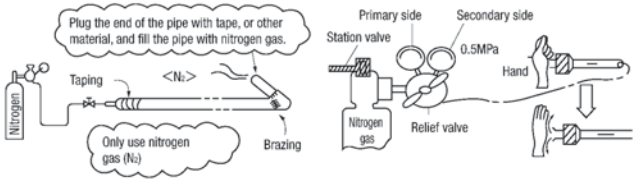
● Determine refrigerant pipe size pursuant to the following guidelines based on the indoor unit specifications.

| | | Model 71V | |
|---|---|---|---|
| | | Gas pipe | Liquid pipe |
| Outdoor unit connected | | φ15.88 Flare | φ9.52 Flare |
| Refrigerant piping (branch pipeL) | | φ15.88 | φ9.52 |
| In the case of a single type | Indoor unit connected | φ15.88 | φ9.52 |
| | Capacity of indoor unit | Model 71V | |
| In the case of a twin type | Branching pipe set | DIS-WA1 | |
| | Refrigerant piping (branch pipe L1,L2) | φ12.7 | φ9.52 |
| | Indoor unit connected | φ12.7 | φ6.35 |
| | Capacity of indoor unit | Model 40V×2 | |

**About brazing**

**Brazing must be performed under a nitrogen gas flow.**

Without nitrogen gas, a large quantity of foreign matters (oxidized film) are created, causing a critical failure from capillary tube or expansion valve clogging.




**⚠CAUTION**

- When the 40V model is connected as an indoor unit, always use a φ9.52 liquid pipe for the branch (branching pipe – indoor unit) and a different diameter joint supplied with the branching pipe set for connection with the indoor unit (φ6.35 on the liquid pipe side).
  If a φ6.35 pipe is used for connection with a branching pipe, a refrigerant distribution disorder may occur, causing one of the indoor units to fall short of the rated capacity.
- A riser pipe must be a part of the main. A branching pipe set should be installed horizontally at a point as close to an indoor unit as possible.
  A branching part must be dressed with a heat-insulation material supplied as an accessory.
- For the details of installation work required at and near a branching area, see the installation manual supplied with your branching pipe set.

## 3) Refrigerant pipe wall thickness and material

● Select refrigerant pipes of the table shown on the right wall thickness and material as specified for each pipe size.

| Pipe diameter [mm] | 6.35 | 9.52 | 12.7 | 15.88 |
|---|---|---|---|---|
| Minimum pipe wall thickness [mm] | 0.8 | 0.8 | 0.8 | 1.0 |
| Pipe material* | O-type pipe | O-type pipe | O-type pipe | O-type pipe |

**NOTE** ● Select pipes having a wall thickness larger than the specified minimum pipe thickness.

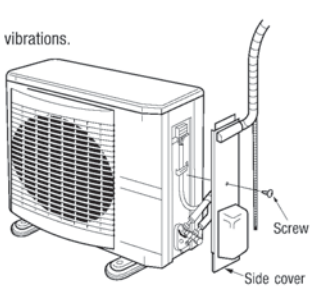
*Phosphorus deoxidized seamless copper pipe C1220T, JIS H3300

## 4) On-site piping work

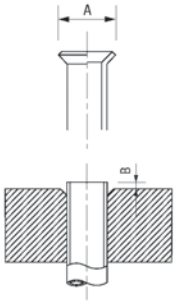
**⚠IMPORTANT**

- Take care so that installed pipes may not touch components within a unit.
  If touching with an internal component, it will generate abnormal sounds and/or vibrations.

**How to remove the side cover** Please remove the screw of a side cover and remove to the front.




- Carry out the on site piping work with the operation valve fully closed.
- Give sufficient protection to a pipe end (compressed and blazed, or with an adhesive tape) so that water or foreign matters may not enter the piping.
- Bend a pipe to a radius as large as practical.(R100～R150) Do not bend a pipe repeatedly to correct its form.
- Flare connection is used between the unit and refrigerant pipe. Flare a pipe after engaging a flare nut onto it. Flare dimensions for R410A are different from those for conventional R407C. Although we recommend the use of flaring tools designed specifically for R410A, conventional flaring tools can also be used by adjusting the measurement of protrusion B with a protrusion control gauge.
- The pipe should be anchored every 1.5m or less to isolate the vibration.
- Tighten a flare joint securely with a double spanner.




Flared pipe end: A (mm)

| Copper pipe outer diameter | A 0 −0.4 |
|---|---|
| φ6.35 | 9.1 |
| φ9.52 | 13.2 |
| φ12.7 | 16.6 |
| φ15.88 | 19.7 |

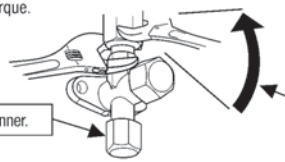
Copper pipe protrusion for flaring: B (mm)

| Copper pipe outer diameter | In the case of a rigid (clutch) type | |
|---|---|---|
| | With an R410A tool | With a conventional tool |
| φ6.35 | 0～0.5 | 0.7～1.3 |
| φ9.52 | | |
| φ12.7 | | |
| φ15.88 | | |

**⚠ CAUTION** **Do not apply force beyond proper fastening torque in tightening the flare nut.**

Fix both liquid and gas service valves at the valve main bodies as illustrated on the right, and then fasten them, applying appropriate fastening torque.

| Operation valve size (mm) | Tightening torque (N-m) | Tightening angle (° ) | Recommended length of a tool handle (mm) |
|---|---|---|---|
| φ6.35 (1/4") | 14～18 | 45～60 | 150 |
| φ9.52 (3/8") | 34～42 | 30～45 | 200 |
| φ12.7 (1/2") | 49～61 | 30～45 | 250 |
| φ15.88(5/8") | 68～82 | 15～20 | 300 |

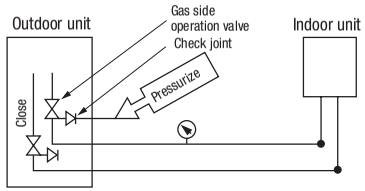



Use a torque wrench. If a torque wrench is not available, fasten the flare nut manually first and then tighten it further, using the left table as a guide.

## 5) Air tightness test

① Although outdoor and indoor units themselves have been tested for air tightness at the factory, check the connecting pipes after the installation work for air tightness from the operation valve's check joint equipped on the outdoor unit side. While conducting a test, keep the operation valve shut all the time.
a) Raise the pressure to 0.5 MPa, and then stop. Leave it for five minutes to see if the pressure drops.
b) Then raise the pressure to 1.5 MPa, and stop. Leave it for five more minutes to see if the pressure drops.
c) Then raise the pressure to the specified level (4.15 MPa), and record the ambient temperature and the pressure.
d) If no pressure drop is observed with an installation pressurized to the specified level and left for about one day, it is acceptable. When the ambient Temperature fall 1°C, the pressure also fall approximately 0.01 MPa. The pressure, if changed, should be compensated for.
e) If a pressure drop is observed in checking e) and a) – d), a leak exists somewhere. Find a leak by applying bubble test liquid to welded parts and flare joints and repair it. After repair, conduct an air-tightness test again.

② In conducting an air-tightness test, use nitrogen gas and pressurize the system with nitrogen gas from the gas side. Do not use a medium other than nitrogen gas under any circumstances.




## 6) Evacuation

<Work flow>

When the system has remaining moisture inside or a leaky point, the vacuum gauge indicator will rise.
Check the system for a leaky point and then draw air to create a vacuum again.

Airtighteness test completed
↓
Vacuuming begins
Run the vacuum pump for at least one hour after the vacuum gauge shows -101kPa or lower. (-755mmHg or lower)
↓
Vacuuming completed
Confirm that the vacuum gauge indicator does not rise even if the system is left for one hour or more.
↓
Vacuum gauge check
↓
Fill refrigerant

**Pay attention to the following points in addition to the above for the R410A and compatible machines.**

○To prevent a different oil from entering, assign dedicated tools, etc. to each refrigerant type. Under no circumstances must a gauge manifold and a charge hose in particular be shared with other refrigerant types (R22, R407C, etc.).
○Use a counterflow prevention adapter to prevent vacuum pump oil from entering the refrigerant system.

## 7) Additional refrigerant charge

(1) Calculate a required refrigerant charge volume from the following table.

| | Standard refrigerant charge volume (kg) | Pipe length for standard refrigerant charge volume (m) | Additional charge volume (kg) per meter of refrigerant piping (liquid pipe $\phi$6.35) | Refrigerant volume charged for shipment at the factory (kg) | Installation's pipe length (m) covered without additional refrigerant charge |
|---|---|---|---|---|---|
| Model 71V | 2.35 | 20 | 0.06 | 2.95 | 30 |

● This unit contains factory charged refrigerant covering 30m of refrigerant piping and additional refrigerant charge on the installation site is not required for an installation with up to 30m refrigerant piping. When refrigerant piping exceeds 30m, additionally charge an amount calculated from the pipe length and the above table for the portion in excess of 30m.
● When refrigerant piping is shorter than 3m, reduce refrigerant by 1kg from the factory charged volume and adjust to 1.95kg.
● If an existing pipe system is used, a required refrigerant charge volume will vary depending on the liquid pipe size. For further information, please see "6. UTILIZATION OF EXISTING PIPING."

Formula to calculate the volume of additional refrigerant required

Additional charge volume (kg) = { Main pipe length (m) – Length covered without additional charge 30 (m) } x 0.06 (kg/m) + Total length of branch pipes (m) x 0.06 (kg/m)

*When an additional charge volume calculation result is negative, it is not necessary to charge refrigerant additionally.

● For an installation measuring 3m or longer, but not more than 20m, in pipe length, please charge the standard refrigerant charge volume, when you recharge refrigerant after servicing etc.
● When refrigerant piping is shorter than 3m, recharge 1.95kg of refrigerant.
Ex.) For a 10m installation, charge 2.35 kg of refrigerant.
For a 25m installation, charge "2.35 + (25-20) x 0.06 = 2.65 kg."

(2) Charging refrigerant

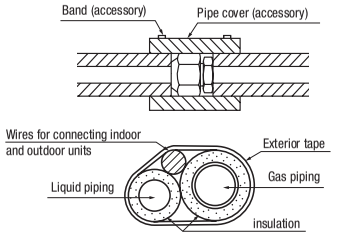
● Since R410A refrigerant must be charged in the liquid phase, you should charge it, keeping the container cylinder upside down or using a refrigerant cylinder equipped with a siphon tube.
● Charge refrigerant always from the liquid side service port with the operation valve shut. When you find it difficult to charge a required amount, fully open the outdoor unit valves on both liquid and gas sides and charge refrigerant from the gas (suction) side service port, while running the unit in the cooling mode. In doing so, care must be taken so that refrigerant may be discharged from the cylinder in the liquid phase all the time. When the cylinder valve is throttled down or a dedicated conversion tool to change liquid-phase refrigerant into mist is used to protect the compressor, however, adjust charge conditions so that refrigerant will gasify upon entering the unit.
● In charging refrigerant, always charge a calculated volume by using a scale to measure the charge volume.
● When refrigerant is charged with the unit being run, complete a charge operation within 30 minutes. Running the unit with an insufficient quantity of refrigerant for a long time can cause a compressor failure.

**NOTE** Put down the refrigerant volume calculated from the pipe length onto the caution label attached on the back side of the service panel.

## 8) Heating and condensation prevention

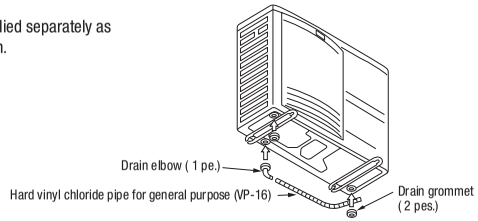
(1) Dress refrigerant pipes (both gas and liquid pipes) for heat insulation and prevention of dew condensation.
- Improper heat insulation/anti-dew dressing can result in a water leak or dripping causing damage to household effects, etc.

(2) Use a heat insulating material that can withstand 120°C or a higher temperature. Poor heat insulating capacity can cause heat insulation problems or cable deterioration.
- All gas pipes must be securely heat insulated in order to prevent damage from dripping water that comes from the condensation formed on them during a cooling operation or personal injury from burns because their surface can reach quite a high temperature due to discharged gas flowing inside during a heating operation.
- Wrap indoor units' flare joints with heat insulating parts (pipe cover) for heat insulation (both gas and liquid pipes).
- Give heat insulation to both gas and liquid side pipes. Bundle a heat insulating material and a pipe tightly together so that no gaps may be left between them and wrap them together with a connecting cable by a dressing tape.
- Although it is verified in a test that this air conditioning unit shows satisfactory performance under JIS condensation test conditions, **both gas and liquid pipes need to be dressed with 20 mm or thicker heat insulation materials above the ceiling where relative humidity exceeds 70%.**



# 3. DRAIN PIPING WORK

● Execute drain piping by using a drain elbow and drain grommets supplied separately as optional parts, where water drained from the outdoor unit is a problem.




○ There are 3 drain holes provided on the bottom plate of an outdoor unit to discharge condensed water.
○ When condensed water needs to be led to a drain, etc., install the unit on a flat base (supplied separately as an optional part) or concrete blocks.
○ Connect a drain elbow as shown in the illustration and close the other two drain holes with grommets.

# 4. ELECTRICAL WIRING WORK For details of electrical cabling, refer to the indoor unit installation manual.

Electrical installation work must be performed by an electrical installation service provider qualified by a power provider of the country.
Electrical installation work must be executed according to the technical standards and other regulations applicable to electrical installations in the country.

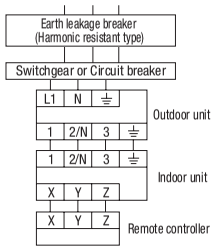
- Do not use any supply cord lighter than one specified in parentheses for each type below.
  - braided cord (code designation 60245 IEC 51),
  - ordinary tough rubber sheathed cord (code designation 60245 IEC 53)
  - flat twin tinsel cord (code designation 60227 IEC 41);

  Do not use anything lighter than polychloroprene sheathed flexible cord (code designation 60245 IEC57) for supply cords of parts of appliances for outdoor use.
- Ground the unit. Do not connect the grounding wire to a gas pipe, water pipe, lightning rod or telephone grounding wire.
  If improperly grounded, an electric shock or malfunction may result.
- A grounding wire must be connected before connecting the power cable. Provide a grounding wire longer than the power cable.
- The installation of an impulse withstanding type earth leakage breaker is necessary. A failure to install an earth leakage breaker can result in an acccident such as an electric shock or a fire.
- Do not turn on the power until the electrical work is completeted .
- Do not use a condensive capacitor for power factor improvement under any circumstances. (It dose not improve power factor, while it can cause an abnormal overheat accident)
- For power supply cables, use conduits.
- Do not lay electronic control cables (remote control and signaling wires) and other cables together outside the unit. Laying them together can result in the malfunctioning or a failure of the unit due to electric noises.
- Fasten cables so that may not touch the piping, etc.
- When cables are connected, make sure that all electrical components within the electrical component box are free of loose connector coupling or terminal connection and then attach the cover securely. (Improper cover attachment can result in malfunctioning or a failure of the unit, if water penetrates into the box.)
- Always use a three-core cable for an indoor-outdoor connecting cable. Never use a shield cable.

## Power cable, indoor-outdoor connecting wires

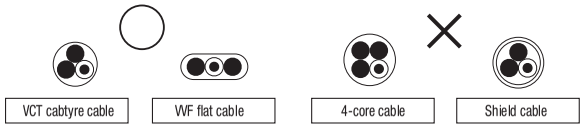
● Always perform grounding system installation work with the power cord unplugged.

**⚠ CAUTION** Always use an earth leakage circuit breaker designed for inverter circuits to prevent a faulty operation.

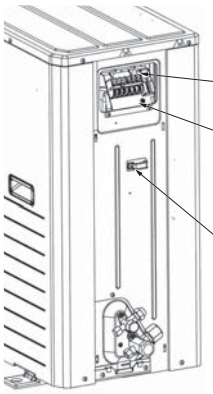



| Model | Power source | Power cable thickness ($mm^2$) | MAX. over current (A) | Cable length (m) | Grounding wire thickness | Indoor-outdoor wire thickness x number |
|---|---|---|---|---|---|---|
| 71V | Single phase 3 wire 220-240V 50Hz | 3.5 | 17 | 21 | $\phi$1.6mm | $\phi$1.6mm x 3 |

●The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.
●Switchgear or Circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.
●The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, follow the internal cabling regulations. Adapt it to the regulation in effect in each country.




● Connect a pair bearing a common terminal number with an indoor-outdoor connecting wire.
● In cabling, fasten cables securely with cable clamps so that no external force may work on terminal connections.
● Grounding terminals are provided in the control box.



Power source, signal line and ground terminal block

Grounding terminal
○ Do not connect to the grounding wire from another unit, but install a dedicated wire up to the grounding wire from the distribution board.

Wiring clamp
○ Fasten cables and protect the terminal connections from external force.

Wiring diagram
○ It is attached on the back side of the service panel.

# 5. TEST RUN

**⚠ WARNING**

- Before conduct a test run, do not fail to make sure that the operation valves are closed.
- Turn on power 6 hours prior to a test run to energize the crank case heater.
- In case of the first operation after turning on power, even if the unit does not move for 30 minutes, it is not a breakdown.
- Always give a 3-minute or longer interval before you start the unit again whenever it is stopped.
- Removing the service panel will expose high-voltage live parts and high-temperature parts, which are quite dangerous. Take utmost care not to incur an electric shock or burns. Do not leave the unit with the service panel open.

} A failure to observe these instructions can result in a compressor breakdown.

**⚠ CAUTION**

- When you operate switches for on-site setting, be careful not to touch a live part.
- You cannot check discharge pressure from the liquid operation valve charge port.
- The 4-way valve (20S) is energized during a heating operation.
- When power supply is cut off to reset the unit, give 3 or more minutes before you turn on power again after power is cut off. If this procedure is not observed in turning on power again, "E-5" (Communication error) may occur.

## About insulation resistance

- An insulation resistance value may drop to several M ohms immediately after installation or when the unit is left for a long time without power, because refrigerant is gathered in the compressor. When the earth-leakage breaker is actuated due to low insulation resistance, please check the following:

(1) Check whether a normal insulation resistance value is restored about 6 hours after power is turned. Turning on power will energize the compressor and heat it to evaporate refrigerant gathered in it.
(2) Check whether the earth-leakage breaker is a harmonic resistant type.
This unit is equipped with an inverter and therefore, the use of a harmonic resistant type earth-leakage breaker is necessary to prevent a false actuation.

## 1) Test run method

### Please remove a side cover.

(1) A test run can be initiated from an outdoor unit by using SW5-4 and SW5-4 for on-site setting.
(2) Switching SW3-3 to ON will start the compressor.
(3) The unit will start a cooling operation, when SW5-4 is OFF, or a heating operation, when SW5-4 is ON.
(4) **Do not fail to switch SW5-3 to OFF when a test run is completed.**

※ **In case of the first operation after turning on the power supply, when the unit runs in the cooling mode at outside temperature 5°C or lower, it automatically changes into the cooling mode after it runs in the heating mode for 10 minutes.**

| SW-3-3 | SW-3-4 | |
|---|---|---|
| ON | OFF | Cooling during a test run |
| | ON | Heating during a test run |
| OFF | — | Normal or After the test operation |

## 2) Checking the state of the unit in operation

### Please remove a service panel.

Use check joints provided on the piping before and after the four-way valve installed inside the outdoor unit for checking discharge pressure and suction pressure.
As indicated in the table shown on the right, pressure detected at each point will vary depending on whether a cooling or heating operation has been selected.

| | Check joint of the pipe | Charge port of the gas operation valve |
|---|---|---|
| Cooling operation | Discharge pressure (High pressure) | Suction pressure (Low pressure) |
| Heating operation | Suction pressure (Low pressure) | Discharge pressure (High pressure) |

## 3) Setting SW3-1, SW3-2.

### Please remove a service panel.

(1) Defrost control switching (SW3-1)
- When this switch is turned ON, the unit will run in the defrost mode more frequently.
- Set this switch to ON, when installed in a region where outdoor temperature falls below zero during the season the unit is run for a heating operation.

(2) Snow guard fan control (SW3-2)
- When this switch is turned on, the outdoor unit fan will run for 30 seconds in every 10 minutes, when outdoor temperature falls to 3°C or lower and the compressor is not running.
- When the unit is used in a very snowy country, set this switch to ON.

## 4) Failure diagnosis in a test run

| Error indicated on the remote control unit | Printed circuit board LED(The cycles of 5 seconds) | | Failure event | Action |
|---|---|---|---|---|
| | Red LED | Green LED | | |
| E34 | Blinking once | Blinking continuously | Open phase | Check power cables for loose contact or disconnection |
| E40 | Blinking once | Blinking continuously | 63H1 actuation or operation with operation valves shut (occurs mainly during a heating operation) | 1. Check whether the operation valves are open.<br>2. If an error has been canceled when 3 minutes have elapsed since a compressor stop, you can restart the unit by effecting Check Reset from the remote control unit. |
| E49 | Blinking once | Blinking continuously | Low pressure error or operation with operation valves shut (occurs mainly during a cooling operation) | |

- If an error code other than those listed above is indicated, refer to the wiring diagram of the outdoor unit and the indoor unit.

## 5) The state of the electronic expansion valve.

The following table illustrates the steady states of the electronic expansion valve.

| | When power is turned on | When the unit comes to a normal stop | | When the unit comes to an abnormal stop | |
|---|---|---|---|---|---|
| | | During a cooling operation | During a heating operation | During a cooling operation | During a heating operation |
| Valve for a cooling operation | Complete shut position | Complete shut position | Full open position | Full open position | Full open position |
| Valve for a heating operation | Full open position | Full open position | Complete shut position | Full open position | Full open position |

## 6) Heed the following on the first operation after turning on the circuit breaker.

This outdoor unit may start in the standby mode (waiting for a compressor startup), which can continue up to 30 minutes, to prevent the oil level in the compressor from lowering on the first operation after turning on the circuit breaker. If that is the case, do not suspect a unit failure.

**Items to checkbefore a test run**

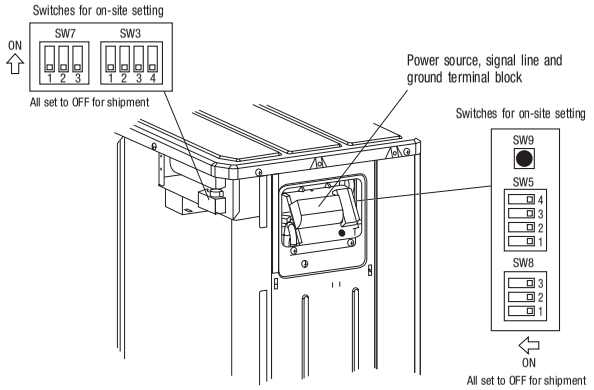
- When you leave the outdoor unit with power supplied to it, be sure to close the panel.

| Item No.used in the installation manual | Item | Check item | Check |
|---|---|---|---|
| 2 | Refrigerant plumbing | If brazed, was it brazed under a nitrogen gas flow? | |
| | | Were air-tightness test and vacuum extraction surely performed? | |
| | | Are heat insulation materials installed on both liquid and gas pipes? | |
| | | Are operation valves surely opened for both liquid and gas systems? | |
| | | Have you recorded the additional refrigerant charge volume and refrigerant pipe length on the panel's label? | |
| 4 | Electric wiring | Is the unit free of cabling errors such as uncompleted connection, an absent or reversed phase? | |
| | | Are properly rated electrical equipments used for circuit breakers and cables? | |
| | | Doesn't cabling cross-connect between units, where more than one unit are installed? | |
| | | Aren't indoor-outdoor signal wires connected to remote control wires? | |
| | | Do indoor-outdoor connecting cables connect between the same terminal numbers? | |
| | | Are either VCT cabtyre cables or WF flat cables used for indoor-outdoor connecting cables? | |
| | | Does grounding satisfy the D type grounding (type III grounding) requirements? | |
| | | Is the unit grounded with a dedicated grounding wire not connected to another unit's grounding wire? | |
| | | Are cables free of loose screws at their connection points? | |
| | | Are cables held down with cable clamps so that no external force works onto terminal connections? | |
| — | Indoor unit | Is indoor unit installation work completed? | |
| | | Where a face cover should be attached onto an indoor unit, is the face cover attached to the indoor unit? | |

**Test run procedure**

- Always carry out a test run and check the following in order as listed.

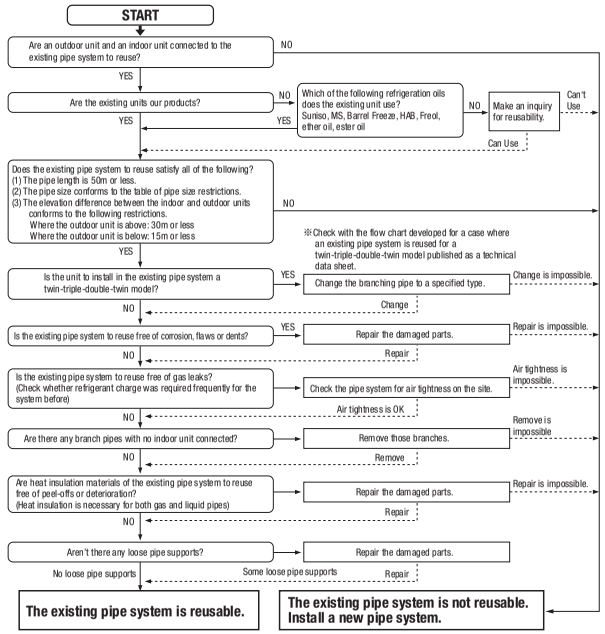
| Turn | The contents of operation | Check |
|---|---|---|
| ① | Open the gas side operation valve fully. | |
| ② | Open the liquid side operation valve fully. | |
| ③ | Close the panel. | |
| ④ | Where a remote control unit is used for unit setup on the installation site, follow instructions for unit setup on the installation site with a remote control unit. | |
| ⑤ | SW5-3 / SW5-4 OFF: the unit will start a cooling operation. | |
| | SW5-3 / SW5-4 ON: the unit will start a heating operation. | |
| ⑥ | When the unit starts operation, press the wind direction button provided on the remote control unit to check its operation. | |
| ⑦ | Place your hand before the indoor unit's diffuser to check whether cold (warm) winds come out in a cooling (heating) operation. | |
| ⑧ | Make sure that a red LED is not blinking. | |
| ⑨ | When you complete the test run, please turn on SW5-3 for 1 second and be sure to end a test run. | |
| ⑩ | Where options are used, check their operation according to the respective instruction manuals. | |




※1 Do not operate SW3-3, SW5-1, SW5-2, SW8.
※2 Refer to TECHNICAL MANUAL about SW9. (Pump down SW)

# 6. UTILIZATION OF EXISTING PIPING.

Check whether an existing pipe system is reusable or not by using the following flow chart.


START
Are an outdoor unit and an indoor unit connected to the existing pipe system to reuse?
NO
YES
Are the existing units our products?
NO
YES
Which of the following refrigeration oils does the existing unit use? Sunisо, MS, Barrel Freeze, HAB, Freol, ether oil, ester oil
NO
Make an inquiry for reusability.
Can't Use
YES
Can Use
Does the existing pipe system to reuse satisfy all of the following?
(1) The pipe length is 50m or less.
(2) The pipe size conforms to the table of pipe size restrictions.
(3) The elevation difference between the indoor and outdoor units conforms to the following restrictions.
Where the outdoor unit is above: 30m or less
Where the outdoor unit is below: 15m or less
NO
※Check with the flow chart developed for a case where an existing pipe system is reused for a twin-triple-double-twin model published as a technical data sheet.
YES
Is the unit to install in the existing pipe system a twin-triple-double-twin model?
YES
Change the branching pipe to a specified type.
Change is impossible.
Change
NO
Is the existing pipe system to reuse free of corrosion, flaws or dents?
YES
Repair the damaged parts.
Repair is impossible.
Repair
NO
Is the existing pipe system to reuse free of gas leaks? (Check whether refrigerant charge was required frequently for the system before)
Check the pipe system for air tightness on the site.
Air tightness is impossible.
Air tightness is OK
NO
Are there any branch pipes with no indoor unit connected?
Remove those branches.
Remove is impossible
Remove
NO
Are heat insulation materials of the existing pipe system to reuse free of peel-offs or deterioration? (Heat insulation is necessary for both gas and liquid pipes)
Repair the damaged parts.
Repair is impossible.
Repair
NO
Aren't there any loose pipe supports?
Repair the damaged parts.
No loose pipe supports
Some loose pipe supports
Repair
The existing pipe system is reusable.
The existing pipe system is not reusable. Install a new pipe system.

**⚠ WARNING** <Where the existing unit can be run for a cooling operation.>

**Carry out the following steps with the excising unit** (in the order of (1), (2), (3) and (4))

(1) Run the unit for 30 minutes for a cooling operation.
(2) Stop the indoor fan and run the unit for 3 minutes for a cooling operation (returning liquid)
(3) Close the liquid side operation valve of the outdoor unit and pump down (refrigerant recovery)
(4) Blow with nitrogen gas. ※ If discolored refrigeration oil or any foreign matters is discharged by the blow, wash the pipe system or install a new pipe system.

- For the flare nut, do not use the old one, but use the one supplied with the outdoor unit. Process a flare to the dimensions specified for R410A.
- **Turn on-site setting switch SW8-1** to the ON position. (Where the gas pipe size is ϕ19.05)

<Table of pipe size restrictions>

◎:Standard pipe size ○:Usable △:Restricted to shorter pipe length limits Cool↓: Cooling capacity drop

| Additional charge volume per meter of pipe | | 0.06kg/m | | 0.08kg/m |
|---|---|---|---|---|
| Pipe size | Liquid pipe | ϕ9.52 | ϕ9.52 | ϕ12.7 |
| | Gas pipe | ϕ12.7 | ϕ15.88 | ϕ15.88 |
| 71V | Usability | Cool↓ | ◎ | △ |
| | Maximum one-way pipe length | 35 | 50 | 25 |
| | Length covered without additional charge | 30 | 30 | 15 |

- **The pipe length should be at least 3m. If the pipe length is shorter than 3m, the quantity of refrigerant needs to be reduced. Please consult with our distributor in the area, if you need to recover refrigerant and charge it again.**
- Any combinations of pipe sizes not listed in the table are not usable.

<Pipe system after the branching pipe>

◎:Standard pipe size ○:Usable

| Additional charging amount of refrigerant per 1m | | | 0.06kg/m | |
|---|---|---|---|---|
| Pipe size | Liquid pipe | | ϕ9.52 | |
| | Gas pipe | | ϕ12.7 | ϕ15.88 |
| Model | Combination type | Combination of capacity | | |
| FDC71 | Twin | 40+40 | ◎ | ○ |

- Any combinations of pipe sizes not listed in the tableare not usable.

<The model types of existing units of which branching pipes are reusable.>

**The branching pipes used with models other than those listed above are not reusable.**

**U**se our genuine branching pipes for R410A.

Formula to calculate additional charge volume

Additional charge volume (kg) = {Main pipe length (m) − Length covered without additional charge shown in the table (m)} × Additional charge volume per meter of pipe shown in the table (kg/m) + Total length of branch pipes (m)× Additional charge volume per meter of pipe shown in the table (kg/m)

※ If you obtain a negative figure as a result of calculation, no additional refrigerant needs to be charged.

**Example)** When an 71V (single installation) is installed in a 30m long existing pipe system (liquid ϕ12.7, gas ϕ15.88), the quantity of refrigerant to charge additionally should be (30m-15m) x 0.08kg/m = 1.2 kg.

**Example)** When an 71V (twin installation) is installed in a 30m long existing pipe system (main pipe length 20m, liquid ϕ12.7, gas ϕ15.88; pipe length after branching pipe 5m x 2, liquid ϕ9.52, gas ϕ12.7), the quantity of refrigerant to charge additionally should be (20m-15m) x 0.08kg/m + 5m x 2 x 0.06kg/m = 1.0 kg.

<Where the existing unit cannot be run for a cooling operation.>

Wash the pipe system or install a new pipe system.

- If you choose to wash the pipe system, contact our distributor in the area.

Inverter driven single split PAC
100VN～140VN,100VS～140VS
100VNX～140VNX,100VSX～140VSX
Designed for R410A refrigerant

## (2) Models FDC100～140VNX, 100～140VSX

◎This installation manual deals with outdoor units and general installation specifications only. For indoor units, refer to the respective installation manuals supplied with the units.
◎When install the unit, be sure to check whether the selection of installation place, power supply specifications, usage limitation (piping length, height differences between indoor and outdoor units, power supply voltage and etc.) and installation spaces

## SAFETY PRECAUTIONS

- We recommend you to read this "SAFETY PRECAUTIONS" carefully before the installation work in order to gain full advantage of the functions of the unit and to avoid malfunction due to mishandling.
- The precautions described below are divided into ⚠WARNING and ⚠CAUTION. The matters with possibilities leading to serious consequences such as death or serious personal injury due to erroneous handling are listed in the ⚠WARNING and the matters with possibilities leading to personal injury or damage of the unit due to erroneous handling including probability leading to serious consequences in some cases are listed in ⚠CAUTION. **These are very important precautions for safety. Be sure to observe all of them without fail.**
- The meaning of "Marks" used here are as shown below.

| | | | |
|---|---|---|---|
| ⃠ | Never do it under any circumstance. | ❗ ⏚ | Always do it according to the instruction |

- For 3 phase power source outdoor unit,EN61000-3-2 is not applicable if consent by the utility company or nortification to the utility company is given before usage.
- 3phase power source unit, both indoor and outdoor, is suitable for installation in a commercial and light industrial environment. If installed as a house-hold appliance it could cause electromagnetic interference.
- 5 and 6 HP units of single phase power source are equipment complying with IEC 61000-3-12.
- Be sure to confirm no anomaly on the equipment by commissioning after completed installation and explain the operating methods as well as the maintenance methods of this equipment to the user according to the owner's manual.
- Keep the installation manual together with owner's manual at a place where any user can read at any time. Moreover if necessary, ask to hand them to a new user

## Check before installation work

**[ Accessory ]**

| | | | |
|---|---|---|---|
| Edging | | 1 piece | knock-out hole protection |

- Model name and power source
- Refrigerant piping length
- Piping, wiring and miscellaneous small parts
- Indoor unit installation manual

## ⚠ WARNING

❗
- **Installation must be carried out by the qualified installer.**
  If you install the system by yourself, it may cause serious trouble such as water leaks, electric shocks, fire and personal injury, as a result of a system malfunction.
- **Install the system in full accordance with the instruction manual.**
  Incorrect installation may cause bursts, personal injury, water leaks, electric shocks and fire.
- **Use the original accessories and the specified components for installation.**
  If parts other than those prescribed by us are used, it may cause fall of the unit, water leaks, electric shocks, fire, refrigerant leak, substandard performance, control failure and personal injury.
- **When installing in small rooms, take prevention measures not to exceed the density limit of refrigerant in the event of leakage accordance with ISO5149.**
  Consult the expert about prevention measures. If the density of refrigerant exceeds the limit in the event of leakage, lack of oxygen can occur, which can cause serious accidents.
- **Ventilate the working area well in the event of refrigerant leakage during installation.**
  If the refrigerant comes into contact with naked flames, poisonous gas is produced.
- **After completed installation, check that no refrigerant leaks from the system.**
  If refrigerant leaks into the room and comes into contact with an oven or other hot surface, poisonous gas is produced.
- **Hang up the unit at the specified points with ropes which can support the weight in lifting for portage. And to avoid jolting out of alignment, be sure to hang up the unit at 4-point support.**
  An improper manner of portage such as 3-point support can cause death or serious personal injury due to falling of the unit
- **Install the unit in a location with good support.**
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- **Ensure the unit is stable when installed, so that it can withstand earthquakes and strong winds.**
  Unsuitable installation locations can cause the unit to fall and cause material damage and personal injury.
- **The electrical installation must be carried out by the qualified electrician in accordance with "the norm for electrical work" and "national wiring regulation", and the system must be connected to the dedicated circuit.**
  Power supply with insufficient capacity and incorrect function done by improper work can cause electric shocks and fire,
- **Be sure to shut off the power before starting electrical work.**
  Failure to shut off the power can cause electric shocks, unit failure or incorrect function of equipment.
- **Be sure to use the cables conformed to safety standard and cable ampacity for power distribution work.**
  Unconformable cables can cause electric leak, anomalous heat production or fire.
- **Use the prescribed cables for electrical connection, tighten the cables securely in terminal block and relieve the cables correctly to prevent overloading the terminal blocks.**
  Loose connections or cable mountings can cause anomalous heat production or fire.
- **Arrange the wiring in the control box so that it cannot be pushed up further into the box. Install the service panel correctly.**
  Incorrect installation may result in overheating and fire.

❗
- **Do not perform brazing work in the airtight room**
  It can cause lack of oxygen.
- **Use the prescribed pipes, flare nuts and tools for R410A.**
  Using existing parts (for R22 or R407C) can cause the unit failure and serious accidents due to burst of the refrigerant circuit.
- **Tighten the flare nut by using double spanners and torque wrench according to prescribed method. Be sure not to tighten the flare nut too much.**
  Loose flare connection or damage on the flare part by tightening with excess torque can cause burst or refrigerant leaks which may result in lack of oxygen.
- **Do not open the service valves for liquid line and gas line until completed refrigerant piping work, air tightness test and evacuation.**
  If the compressor is operated in state of opening service valves before completed connection of refrigerant piping work, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked into refrigerant circuit, which can cause burst or personal injury due to anomalously high pressure in the refrigerant
- **Only use prescribed optional parts. The installation must be carried out by the qualified installer.**
  If you install the system by yourself, it can cause serious trouble such as water leaks, electric shocks, fire.
- **Do not perform any change of protective device itself or its setup condition**
  The forced operation by short-circuiting protective device of pressure switch and temperature controller or the use of non specified component can cause fire or burst.
- **Be sure to switch off the power supply in the event of installation, inspection or servicing.**
  If the power supply is not shut off, there is a risk of electric shocks, unit failure or personal injury due to the unexpected start of fan.
- **Consult the dealer or an expert regarding removal of the unit.**
  Incorrect installation can cause water leaks, electric shocks or fire.
- **Stop the compressor before closing valve and disconnecting refrigerant pipes in case of pump down operation.**
  If disconnecting refrigerant pipes in state of opening service valves before compressor stopping, you may incur frost bite or injury from an abrupt refrigerant outflow and air can be sucked, which can cause burst or personal injury due to anomalously high pressure in the refrigerant circuit

⃠
- **Ensure that no air enters in the refrigerant circuit when the unit is installed and removed.**
  If air enters in the refrigerant circuit, the pressure in the refrigerant circuit becomes too high, which can cause burst and personal injury.
- **Do not run the unit with removed panels or protections**
  Touching rotating equipments, hot surfaces or high voltage parts can cause personal injury due to entrapment, burn or electric shocks.
- **Be sure to fix up the service panels.**
  Incorrect fixing can cause electric shocks or fire due to intrusion of dust or water.
- **Do not perform any repairs or modifications by yourself. Consult the dealer if the unit requires repair.**
  If you repair or modify the unit, it can cause water leaks, electric shocks or fire.

## ⚠ CAUTION

- **Carry out the electrical work for ground lead with care**
  Do not connect the ground lead to the gas line, water line, lightning conductor or telephone line's ground lead. Incorrect grounding can cause unit faults such as electric shocks due to short-circuiting. Never connect the grounding wire to a gas pipe because if gas leaks,it could cause explosion or ignition.
- **Use the circuit breaker for all pole with correct capacity.**
  Using the incorrect circuit breaker, it can cause the unit malfunction and fire.
- **Install isolator or disconnect switch on the power supply wiring in accordance with the local codes and regulations.**
  The isolator should be locked in accordanced with EN60204-1.
- **Take care when carrying the unit by hand.**
  If the unit weights more than 20kg, it must be carried by two or more persons. Do not carry by the plastic straps, always use the carry handle when carrying the unit by hand. Use gloves to minimize the risk of cuts by the aluminum fins.
- **Dispose of any packing materials correctly.**
  Any remaining packing materials can cause personal injury as it contains nails and wood. And to avoid danger of suffocation, be sure to keep the plastic wrapper away from children and to dispose after tear it up.
- **Pay attention not to damage the drain pan by weld spatter when welding work is done near the indoor unit.**
  If weld spatter entered into the indoor unit during welding work, it can cause pin-hole in drain pan and result in water leakage. To prevent such damage, keep the indoor unit in its packing or cover it.
- **Be sure to insulate the refrigerant pipes so as not to condense the ambient air moisture on them.**
  Insufficient insulation can cause condensation, which can lead to moisture damage on the ceiling, floor, furniture and any other valuables.
- **Be sure to perform air tightness test by pressurizing with nitrogen gas after completed refrigerant piping work.**
  If the density of refrigerant exceeds the limit in the event of refrigerant leakage in the small room, lack of oxygen can occur, which can cause serious accidents.
- **Perform installation work properly according to this installation manual.**
  Improper installation can cause abnormal vibrations or increased noise generation.
- **Earth leakage breaker must be installed**
  If the earth leakage breaker is not installed, it can cause fire or electric shocks.
- **Do not use any materials other than a fuse with the correct rating in the location where fuses are to be used.**
  Connecting the circuit with copper wire or other metal thread can cause unit failure and fire.
- **Do not install the unit near the location where leakage of combustible gases can occur.**
  If leaked gases accumulate around the unit, it can cause fire.
- **Do not install the unit where corrosive gas (such as sulfurous acid gas etc.) or combustible gas (such as thinner and petroleum gases) can accumulate or collect, or where volatile combustible substances are handled.**
  Corrosive gas can cause corrosion of heat exchanger, breakage of plastic parts and etc. And combustible gas can cause fire.
- **Secure a space for installation, inspection and maintenance specified in the manual.**
  Insufficient space can result in accident such as personal injury due to falling from the installation place..
- **When the outdoor unit is installed on a roof or a high place, provide permanent ladders and handrails along the access route and fences and handrails around the outdoor unit.**
  If safety facilities are not provided, it can cause personal injury due to falling from the installation place.
- **Do not install nor use the system close to the equipment that generates electromagnetic fields or high frequency harmonics**
  Equipment such as inverters, standby generators, medical high frequency equipments and telecommunication equipments can affect the system, and cause malfunctions and breakdowns. The system can also affect medical equipment and telecommunication equipment, and obstruct its function or cause jamming.
- **Do not install the outdoor unit in a location where insects and small animals can inhabit.**
  Insects and small animals can enter the electric parts and cause damage or fire. Instruct the user to keep the surroundings clean.
- **Do not use the base flame for outdoor unit which is corroded or damaged due to long periods of operation.**
  Using an old and damage base flame can cause the unit falling down and cause personal injury.
- **Do not install the unit in the locations listed below**
  - Locations where carbon fiber, metal powder or any powder is floating.
  - Locations where any substances that can affect the unit such as sulphide gas, chloride gas, acid and alkaline can occur.
  - Vehicles and ships
  - Locations where cosmetic or special sprays are often used.
  - Locations with direct exposure of oil mist and steam such as kitchen and machine plant.
  - Locations where any machines which generate high frequency harmonics are used.
  - Locations with salty atmospheres such as coastlines
  - Locations with heavy snow (If installed, be sure to provide base flame and snow hood mentioned in the manual)
  - Locations where the unit is exposed to chimney smoke
  - Locations at high altitude (more than 1000m high)
  - Locations with ammonic atmospheres
  - Locations where heat radiation from other heat source can affect the unit
  - Locations without good air circulation.
  - Locations with any obstacles which can prevent inlet and outlet air of the unit
  - Locations where short circuit of air can occur (in case of multiple units installation)
  - Locations where strong air blows against the air outlet of outdoor unit

  It can cause remarkable decrease in performance, corrosion and damage of components, malfunction and fire.
- **Do not install the outdoor unit in the locations listed below.**
  - Locations where discharged hot air or operating sound of the outdoor unit can bother neighborhood.
  - Locations where outlet air of the outdoor unit blows directly to an animal or plants. The outlet air can affect adversely to the plant etc.
  - Locations where vibration can be amplified and transmitted due to insufficient strength of structure.
  - Locations where vibration and operation sound generated by the outdoor unit can affect seriously. (on the wall or at the place near bed room)
  - Locations where an equipment affected by high harmonics is placed. (TV set or radio receiver is placed within 5m)
  - Locations where drainage cannot run off safely.

  It can affect surrounding environment and cause a claim
- **Do not use the unit for special purposes such as storing foods, cooling precision instruments and preservation of animals, plants or art.**
  It can cause the damage of the items.
- **Do not touch any buttons with wet hands**
  It can cause electric shocks
- **Do not touch any refrigerant pipes with your hands when the system is in operation.**
  During operation the refrigerant pipes become extremely hot or extremely cold depending the operating condition, and it can cause burn injury or frost injury.
- **Do not clean up the unit with water**
  It can cause electric shocks
- **Do not operate the outdoor unit with any article placed on it.**
  You may incur property damage or personal injure from a fall of the article.
- **Do not step onto the outdoor unit.**
  You may incur injury from a drop or fall.

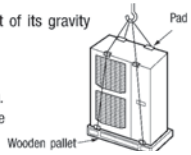
## Notabilia as a unit designed for R410A

- Do not use any refrigerant other than R410A. R410A will rise to pressure about 1.6 times higher than that of a conventional refrigerant. A cylinder containing R410A has a pink indication mark on the top.
- A unit designed for R410A has adopted a different size indoor unit operation valve charge port and a different size check joint provided in the unit to prevent the charging of a wrong refrigerant by mistake. The processed dimension of the flared part of a refrigerant pipe and a flare nut's parallel side measurement have also been altered to raise strength against pressure. Accordingly, you are required to arrange dedicated R410A tools listed in the table on the right before installing or servicing this unit.
- Do not use a charge cylinder. The use of a charge cylinder will cause the refrigerant composition to change, which results in performance degradation.
- In charging refrigerant, always take it out from a cylinder in the liquid phase.
- All indoor units must be models designed exclusively for R410A. Check connectable indoor unit models in a catalog, etc. (A wrong indoor unit, if connected into the system, will impair proper system operation)

| | Dedicated R410A tools |
|---|---|
| a) | Gauge manifold |
| b) | Charge hose |
| c) | Electronic scale for refrigerant charging |
| d) | Torque wrench |
| e) | Flare tool |
| f) | Protrusion control copper pipe gauge |
| g) | Vacuum pump adapter |
| h) | Gas leak detector |

# 1. HAULAGE AND INSTALLATION (Take particular care in carrying in or moving the unit, and always perform such an operation with two or more persons.)

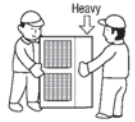
**⚠CAUTION** When a unit is hoisted with slings for haulage, take into consideration the offset of its gravity center position.
If not properly balanced, the unit can be thrown off-balance and fall.




## 1) Delivery

- Deliver the unit as close as possible to the installation site before removing it from the packaging.
- When some compelling reason necessitates the unpacking of the unit before it is carried in, use nylon slings or protective wood pieces so as not to damage the unit by ropes lifting it.

## 2) Portage




- The right hand side of the unit as viewed from the front (diffuser side) is heavier. A person carrying the right hand side must take heed of this fact. A person carrying the left hand side must hold with his right hand the handle provided on the front panel of the unit and with his left hand the corner column section.

## 3) Selection of installation location for the outdoor unit

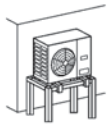
Be sure to select a suitable installation place in consideration of following conditions.

- ○ A place where it is horizontal, stable and can endure the unit weight and will not allow vibration transmittance of the unit.
- ○ A place where it can be free from possibility of bothering neighbors due to noise or exhaust air from the unit
- ○ A place where the unit is not exposed to oil splashes.
- ○ A place where it can be free from danger of flammable gas leakage.
- ○ A place where drain water can be disposed without any trouble.
- ○ A place where the unit will not be affected by heat radiation from other heat source.
- ○ A place where snow will not accumulate.
- ○ A place where the unit can be kept away 5m or more from TV set and/or radio receiver in order to avoid any radio or TV interference.
- ○ A place where good air circulation can be secured, and enough service space can be secured for maintenance and service of the unit safely.
- ○ A place where the unit will not be affected by electromagnetic waves and/or high-harmonic waves generated by other equipment.
- ○ A place where chemical substances like sulfuric gas, chloric gas, acid and alkali (including ammonia), which can harm the unit, will not be generated and not remain.
- ○ A place where strong wind will not blow against the outlet air blow of the unit.

## 4) Caution about selection of installation location

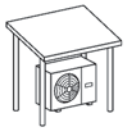
(1) If the unit is installed in the area where the snow will accumulate, following measures are required.
The bottom plate of unit and intake, outlet may be blocked by snow.

1.Install the unit on the base so that the bottom is higher than snow cover surface.



2.Provide a snow hood to the outdoor unit on site. Regarding outline of a snow hood, refer to our technical manual.

3.Install the unit under eaves or providen the roof on site.

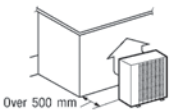


Since drain water generated by defrost control may freeze, following measures are required.

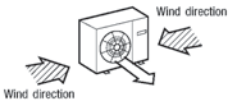
- Don't execute drain piping work by using a drain elbow and drain grommets (optional parts). [Refer to Drain piping work.]
- Recommend setting Defrost Control (SW3-1) and Snow Guard Fan Control (SW3-2). [Refer to Setting SW3-1, SW3-2.]

(2) If the unit can be affected by strong wind, following measures are required.
Strong wind can cause damage of fan (fan motor), or can cause performance degradation, or can trigger anomalous stop of the unit due to rising of high pressure.

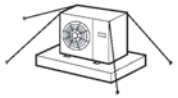
1.Install the outlet air blow side of the unit to face a wall of building, or provide a fence or a windbreak screen.




2.Install the outlet air blow side of the unit in a position perpendicular to the direction of wind.




3.The unit should be installed on the stable and level foundation. If the foundation is not level, tie down the unit with wires.

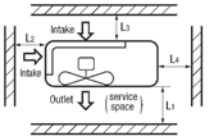


## 5) Installation space

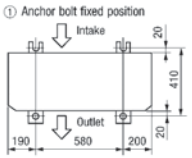
- Walls surrounding the unit in the four sides are not acceptable.
- There must be a 1-meter or larger space in the above.
- Where a danger of short-circuiting exists, install guide louvers.
- When more than one unit are installed, provide sufficient intake space consciously so that short-circuiting may not occur.
- Where piling snow can bury the outdoor unit, provide proper snow guards.
- A barrier wall placed in front of the exhaust diffuser must not be higher than the unit.

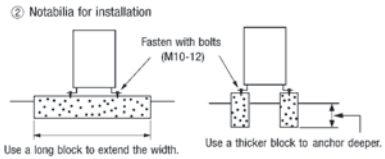
(mm)

| Size \ Example installation | I | II | III |
|---|---|---|---|
| L1 | Open | Open | 500 |
| L2 | 300 | 5 | Open |
| L3 | 150 | 300 | 150 |
| L4 | 5 | 5 | 5 |




## 6) Installation





② Notabilia for installation
Fasten with bolts (M10-12)
Use a long block to extend the width.
Use a thicker block to anchor deeper.

- In installing the unit, fix the unit's legs with bolts specified on the left.
- The protrusion of an anchor bolt on the front side must be kept within 15 mm.
- Securely install the unit so that it does not fall over during earthquakes or strong winds, etc.
- Refer to the left illustrations for information regarding concrete foundations.
- Install the unit in a level area. (With a gradient of 5 mm or less.)
  Improper installation can result in a compressor failure, broken piping within the unit and abnormal noise generation.

## 7) To run the unit for a cooling operation, when the outdoor temperature is –5°C or lower.

- When the outdoor air temperature is -5°C or lower, provide a snow hood to the outdoor unit on site.
  So that strong wind will not blow against the outdoor heat exchanger directly. Regarding outline of a snow hood, refer to our technical manual.

# 2. REFRIGERANT PIPING WORK

## 1) Restrictions on unit installation and use

- Check the following points in light of the indoor unit specifications and the installation site.
- Observe the following restrictions on unit installation and use. Improper installation can result in a compressor failure or performance degradation.

| Descriptions | One-way pipe length difference from the first branching point to the indoor unit | | Marks appearing in the drawing | | | |
|---|---|---|---|---|---|---|
| | | | | | < 3m | ≧ 3m |
| | Model for outdoor units | Dimensional limitations | Single type | Twin type | Triple type A | Triple type B |
| One-way pipe length of refrigerant piping | 100VN,125VN,100VS,125VS | ≦ 50m | L | L+L1+L2 | — | — |
| | 140VN,140VS | | | | L+L1+L2+L3 | L+La+L1+L2+L3 |
| | 100VNX,125VNX,100VSX,125VSX | ≦ 100m | | | — | — |
| | 140VNX,140VSX | | | | L+L1+L2+L3 | L+La+L1+L2+L3 |
| Main pipe length | 100VN,125VN,100VS,125VS | ≦ 50m | — | L | — | — |
| | 140VN,140VS | | | | L | L |
| | 100VNX,125VNX,100VSX,125VSX | ≦ 100m | | | — | — |
| | 140VNX,140VSX | | | | L | L |
| One-way pipe length between the first branching point from to the second branching point | 140VN,140VS, 140VNX,140VSX | ≦ 5m | — | — | — | La |
| One-way pipe length after the first branching point | 100VN,125VN,100VS,125VS, 100VNX,125VNX,100VSX,125VSX | ≦ 30m | — | L1, L2 | — | — |
| | | | | | L1, L2, L3 | L1 (1) |
| One-way pipe length after the first branching point and second branching point | 140VN,140VS,140VNX,140VSX | ≦ 27m | — | — | — | La+L2, La+L3 (1) |
| One-way pipe length difference from the first branching point to the indoor unit | Twin type | ≦ 10m | — | \| L1−L2 \| | — | — |
| | Triple type 140VN,140VS, 140VNX,140VSX | ≦ 3m | | | \| L1−L2 \| , \| L2−L3 \| , \| L3−L1 \| | |
| | | ≦ 10m | | | — | L−(La+L2), L1−(La+L3) (1) |
| One-way pipe length difference from the second branching point to the indoor unit | 140VN,140VS, 140VNX,140VSX | ≦ 10m | — | — | — | \| L2−L3 \| |
| Elevation difference between indoor and outdoor units | When the outdoor unit is positioned higher, | ≦ 30m | H | H | H | H |
| | When the outdoor unit is positioned lower, | ≦ 15m | | | | |
| Elevation difference between indoor units | | ≦ 0.5m | — | h | h1, h2, h3 | h1, h2, h3 |

**⚠CAUTION**

- The use restrictions appearing in the table above are applicable to the standard pipe size combinations shown in the table below. Where an existing pipe system is utilized, different one-way pipe length restrictions should apply depending on its pipe size. For more information, see " 6. UTILIZATION OF EXISTING PIPING."
- With the triple pipe connection, the way of use is different when the difference of one-way pipe length after the first branching point is 3m to 10m. For details, refer to the above table and right figure.

Note (1) Install the indoor units so that L + L1 becomes the longest one-way pipe.
Keep the pipe length difference between L1 and (La + L2) or (La + L3) within 10m.

## 2) Determination of pipe size

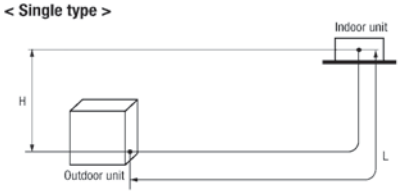
- Determine refrigerant pipe size pursuant to the following guidelines based on the indoor unit specifications.

| | | Model 100V | | Model 125V | | Model 140V | |
|---|---|---|---|---|---|---|---|
| | | Gas pipe | Liquid pipe | Gas pipe | Liquid pipe | Gas pipe | Liquid pipe |
| Outdoor unit connected | | ϕ15.88 | ϕ9.52 | ϕ15.88 | ϕ9.52 | ϕ15.88 | ϕ9.52 |
| | | Flare | Flare | Flare | Flare | Flare | Flare |
| Refrigerant piping (branch pipe∠) | | ϕ15.88 | ϕ9.52 | ϕ15.88 | ϕ9.52 | ϕ15.88 | ϕ9.52 |
| In the case of a single type | Indoor unit connected | ϕ15.88 | ϕ9.52 | ϕ15.88 | ϕ9.52 | ϕ15.88 | ϕ9.52 |
| | Capacity of indoor unit | Model 100V | | Model 125V | | Model 140V | |
| In the case of a twin type | Branching pipe set | DIS-WA1 | | DIS-WA1 | | DIS-WA1 | |
| | Refrigerant piping (branch pipe L1,L2) | ϕ12.7 | ϕ9.52 | ϕ12.7 | ϕ9.52 | ϕ15.88 | ϕ9.52 |
| | Indoor unit connected | ϕ12.7 | ϕ6.35 | ϕ12.7 | ϕ6.35 | ϕ15.88 | ϕ9.52 |
| | Capacity of indoor unit | Model 50V×2 | | Model 60V×2 | | Model 71V×2 | |
| In the case of a triple type A | Branching pipe set | — | | — | | DIS-TA1 | |
| | Refrigerant piping (branch pipe L1,L2,L3) | | | | | ϕ12.7 | ϕ9.52 |
| | Indoor unit connected | | | | | ϕ12.7 | ϕ6.35 |
| | Capacity of indoor unit | | | | | Model 50Vx3 | |
| In the case of a triple type B | Branching pipe set | — | | — | | DIS-WA1 | |
| | Refrigerant piping (branch pipe La) | | | | | ϕ15.88 | ϕ9.52 |
| | Refrigerant piping (branch pipe L1) | | | | | ϕ12.7 | ϕ9.52 |
| | Indoor unit connected | | | | | DIS-WA1 | |
| | Refrigerant piping (branch pipe L2,L3) | | | | | ϕ12.7 | ϕ9.52 |
| | Indoor unit connected | | | | | ϕ12.7 | ϕ6.35 |
| | Capacity of indoor unit | | | | | Model 50V×3 | |

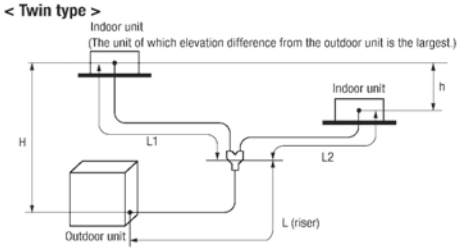
**⚠CAUTION**

- When the 50V or 60V model is connected as an indoor unit, always use a ϕ9.52 liquid pipe for the branch (branching pipe – indoor unit) and a different diameter joint supplied with the branching pipe set for connection with the indoor unit (ϕ6.35 on the liquid pipe side).
  If a ϕ6.35 pipe is used for connection with a branching pipe, a refrigerant distribution disorder may occur, causing one of the indoor units to fall short of the rated capacity.
- A riser pipe must be a part of the main. A branching pipe set should be installed horizontally at a point as close to an indoor unit as possible.
  A branching part must be dressed with a heat-insulation material supplied as an accessory.
- For the details of installation work required at and near a branching area, see the installation manual supplied with your branching pipe set.

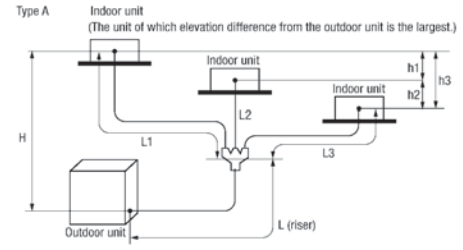
**< Single type >**



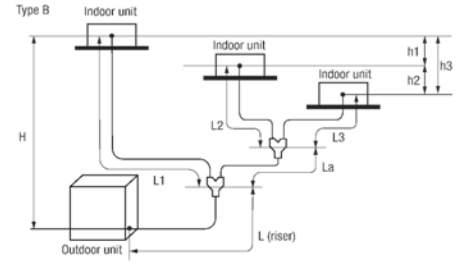

**< Twin type >**




**< Triple type >**



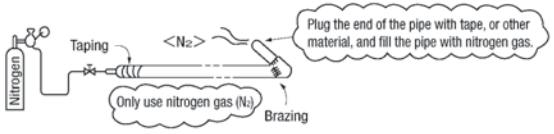

**< Triple type >**

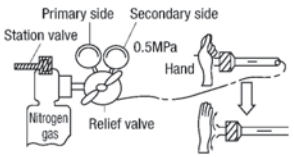



**About brazing**

**Brazing must be performed under a nitrogen gas flow.**

Without nitrogen gas, a large quantity of foreign matters (oxidized film) are created, causing a critical failure from capillary tube or expansion valve clogging.


Nitrogen
Taping
<N2>
Plug the end of the pipe with tape, or other material, and fill the pipe with nitrogen gas.
Only use nitrogen gas (N2).
Brazing



## 3) Refrigerant pipe wall thickness and material

- Select refrigerant pipes of the table shown on the right wall thickness and material as specified for each pipe size.
- This unit uses R410A. Always use 1/2H pipes having a 1.0mm or thicker wall for $\phi$19.05 or larger pipes, because O-type pipes do not meet the pressure resistance requirement.

| Pipe diameter [mm] | 6.35 | 9.52 | 12.7 | 15.88 | 22.22 | 25.4 | 28.58 |
|---|---|---|---|---|---|---|---|
| Minimum pipe wall thickness [mm] | 0.8 | 0.8 | 0.8 | 1.0 | 1.0 | 1.0 | 1.0 |
| Pipe material* | O-type pipe | O-type pipe | O-type pipe | O-type pipe | 1/2H-type pipe | 1/2H-type pipe | 1/2H-type pipe |

*Phosphorus deoxidized seamless copper pipe C1220T, JIS H3300

**NOTE**

- Select pipes having a wall thickness larger than the specified minimum pipe thickness.

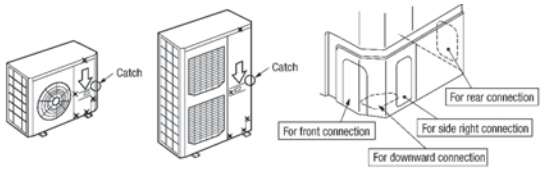
## 4) On-site piping work

**⚠IMPORTANT**

- Take care so that installed pipes may not touch components within a unit. If touching with an internal component, it will generate abnormal sounds and/or vibrations.

**How to remove the service panel**

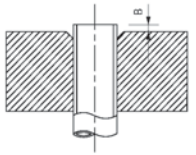
First remove the five screws (× mark) of the service panel and push it down into the direction of the arrow mark and then remove it by pulling it toward you.




- The pipe can be laid in any of the following directions: side right, front, rear and downward.
- Remove a knock-out plate provided on the pipe penetration to open a minimum necessary area and attach an edging material supplied as an accessory by cutting it to an appropriate length before laying a pipe.
- Carry out the on site piping work with the operation valve fully closed.
- Give sufficient protection to a pipe end (compressed and blazed, or with an adhesive tape) so that water or foreign matters may not enter the piping.
- Bend a pipe to a radius as large as practical.(R100~R150) Do not bend a pipe repeatedly to correct its form.
- Flare connection is used between the unit and refrigerant pipe. Flare a pipe after engaging a flare nut onto it. Flare dimensions for R410A are different from those for conventional R407C. Although we recommend the use of flaring tools designed specifically for R410A, conventional flaring tools can also be used by adjusting the measurement of protrusion B with a protrusion control gauge.
- The pipe should be anchored every 1.5m or less to isolate the vibration.
- Tighten a flare joint securely with a double spanner.

Flared pipe end: A (mm)

| Copper pipe outer diameter | A 0 −0.4 |
|---|---|
| $\phi$6.35 | 9.1 |
| $\phi$9.52 | 13.2 |
| $\phi$12.7 | 16.6 |
| $\phi$15.88 | 19.7 |



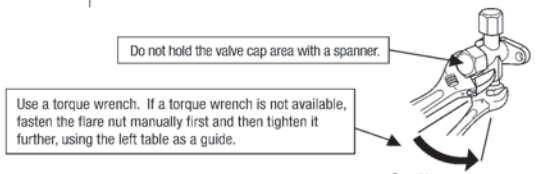

Copper pipe protrusion for flaring: B (mm)

| Copper pipe outer diameter | In the case of a rigid (clutch) type | |
|---|---|---|
| | With an R410A tool | With a conventional tool |
| $\phi$6.35 | 0~0.5 | 0.7~1.3 |
| $\phi$9.52 | | |
| $\phi$12.7 | | |
| $\phi$15.88 | | |

**⚠ CAUTION** **Do not apply force beyond proper fastening torque in tightening the flare nut.**

Fix both liquid and gas service valves at the valve main bodies as illustrated on the right, and then fasten them, applying appropriate fastening torque.

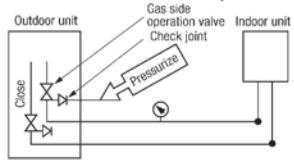
| Operation valve size (mm) | Tightening torque (N-m) | Tightening angle (° ) | Recommended length of a tool handle (mm) |
|---|---|---|---|
| $\phi$6.35 (1/4") | 14~18 | 45~60 | 150 |
| $\phi$9.52 (3/8") | 34~42 | 30~45 | 200 |
| $\phi$12.7 (1/2") | 49~61 | 30~45 | 250 |
| $\phi$15.88 (5/8") | 68~82 | 15~20 | 300 |


Do not hold the valve cap area with a spanner.
Use a torque wrench. If a torque wrench is not available, fasten the flare nut manually first and then tighten it further, using the left table as a guide.

## 5) Air tightness test

① Although outdoor and indoor units themselves have been tested for air tightness at the factory, check the connecting pipes after the installation work for air tightness from the operation valve's check joint equipped on the outdoor unit side. While conducting a test, keep the operation valve shut all the time.
- a) Raise the pressure to 0.5 MPa, and then stop. Leave it for five minutes to see if the pressure drops.
- b) Then raise the pressure to 1.5 MPa, and stop. Leave it for five more minutes to see if the pressure drops.
- c) Then raise the pressure to the specified level (4.15 MPa), and record the ambient temperature and the pressure.
- d) If no pressure drop is observed with an installation pressurized to the specified level and left for about one day, it is acceptable. When the ambient Temperature fall 1℃, the pressure also fall approximately 0.01 MPa. The pressure, if changed, should be compensated for.
- e) If a pressure drop is observed in checking e) and a) – d), a leak exists somewhere. Find a leak by applying bubble test liquid to welded parts and flare joints and repair it. After repair, conduct an air-tightness test again.

② In conducting an air-tightness test, use nitrogen gas and pressurize the system with nitrogen gas from the gas side. Do not use a medium other than nitrogen gas under any circumstances.

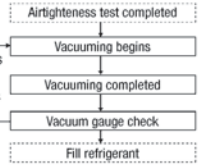



## 6) Evacuation

<Work flow> When the system has remaining moisture inside or a leaky point, the vacuum gauge indicator will rise.
Check the system for a leaky point and then draw air to create a vacuum again.

Run the vacuum pump for at least one hour after the vacuum gauge shows -101kPa or lower. (-755mmHg or lower)

Confirm that the vacuum gauge indicator does not rise even if the system is left for one hour or more.




**Pay attention to the following points in addition to the above for the R410A and compatible machines.**

- ○To prevent a different oil from entering, assign dedicated tools, etc. to each refrigerant type. Under no circumstances must a gauge manifold and a charge hose in particular be shared with other refrigerant types (R22, R407C, etc.).
- ○Use a counterflow prevention adapter to prevent vacuum pump oil from entering the refrigerant system.

## 7) Additional refrigerant charge

(1) Calculate a required refrigerant charge volume from the following table.

<Single type>

| Item / Capacity | Standard refrigerant charge volume (kg) | Pipe length for standard refrigerant charge volume (m) | Additional charge volume (kg) per meter of refrigerant piping (liquid pipe) | Refrigerant volume charged for shipment at the factory (kg) | Installation's pipe length (m) covered without additional refrigerant charge |
|---|---|---|---|---|---|
| 100VN~140VN 100VS~140VS | 2.0 | 0 | 0.06 | 3.8 | 30 |
| 100VNX~140VNX 100VSX~140VSX | 2.7 | | | 4.5 | |

<Twin, triple, W-twin type>

| Item / Capacity | Standard refrigerant charge volume (kg) | Pipe length for standard refrigerant charge volume (m) | Additional charge volume (kg) per meter of refrigerant piping (liquid pipe) | | Refrigerant volume charged for shipment at the factory (kg) | Installation's pipe length (m) covered without additional refrigerant charge |
|---|---|---|---|---|---|---|
| | | | Main pipe | Branch pipe | | |
| 100VN~140VN 100VS~140VS | 2.0 | 0 | 0.06 | | 3.8 | 30 |
| 100VNX~140VNX 100VSX~140VSX | 2.7 | | | | 4.5 | |

- A standard refrigerant charge volume means a refrigerant charge volume for an installation with 0m long refrigerant piping.
- This unit contains factory charged refrigerant covering 30m of refrigerant piping and additional refrigerant charge on the installation site is not required for an installation with up to 30m refrigerant piping. When refrigerant piping exceeds 30m, additionally charge an amount calculated from the pipe length and the above table for the portion in excess of 30m.
- When refrigerant piping is shorter than 3m, reduce refrigerant by 1kg from the factory charged volume and adjust to 2.8kg.
- If an existing pipe system is used, a required refrigerant charge volume will vary depending on the liquid pipe size. For further information, see "6. UTILIZATION OF EXISTING PIPING."

Formula to calculate the volume of additional refrigerant required

Additional charge volume (kg) = { Main pipe length (m) − Length covered without additional charge 30 (m) } x 0.06 (kg/m) + Total length of branch pipes (m) x 0.06 (kg/m)

*When an additional charge volume calculation result is negative, it is not necessary to charge refrigerant additionally.

- **To charge refrigerant again, recover refrigerant from the system first and then charge the volume calculated from the above table (Standard refrigerant charge volume + branch pipes charge volume)**

(2) Charging refrigerant

- Since R410A refrigerant must be charged in the liquid phase, you should charge it, keeping the container cylinder upside down or using a refrigerant cylinder equipped with a siphon tube.
- Charge refrigerant always from the liquid side service port with the operation valve shut. When you find it difficult to charge a required amount, fully open the outdoor unit valves on both liquid and gas sides and charge refrigerant from the gas (suction) side service port, while running the unit in the cooling mode. In doing so, care must be taken so that refrigerant may be discharged from the cylinder in the liquid phase all the time. When the cylinder valve is throttled down or a dedicated conversion tool to change liquid-phase refrigerant into mist is used to protect the compressor, however, adjust charge conditions so that refrigerant will gasify upon entering the unit.
- In charging refrigerant, always charge a calculated volume by using a scale to measure the charge volume.
- When refrigerant is charged with the unit being run, complete a charge operation within 30 minutes. Running the unit with an insufficient quantity of refrigerant for a long time can cause a compressor failure.

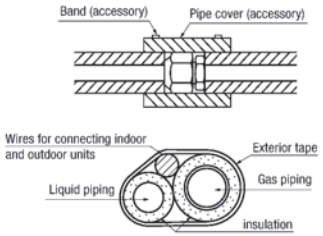
**NOTE** Put down the refrigerant volume calculated from the pipe length onto the caution label attached on the back side of the service panel.

### 8) Heating and condensation prevention

(1) Dress refrigerant pipes (both gas and liquid pipes) for heat insulation and prevention of dew condensation.

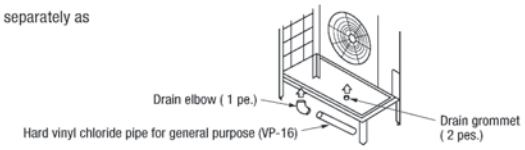
(2) Use a heat insulating material that can withstand 120°C or a higher temperature. Poor heat insulating capacity can cause heat insulation problems or cable deterioration.

- Improper heat insulation/anti-dew dressing can result in a water leak or dripping causing damage to household effects, etc.
- All gas pipes must be securely heat insulated in order to prevent damage from dripping water that comes from the condensation formed on them during a cooling operation or personal injury from burns because their surface can reach quite a high temperature due to discharged gas flowing inside during a heating operation.
- Wrap indoor units' flare joints with heat insulating parts (pipe cover) for heat insulation (both gas and liquid pipes).
- Give heat insulation to both gas and liquid side pipes. Bundle a heat insulating material and a pipe tightly together so that no gaps may be left between them and wrap them together with a connecting cable by a dressing tape.
- Although it is verified in a test that this air conditioning unit shows satisfactory performance under JIS condensation test conditions, **both gas and liquid pipes need to be dressed with 20 mm or thicker heat insulation materials above the ceiling where relative humidity exceeds 70%.**




## 3. DRAIN PIPING WORK

● Execute drain piping by using a drain elbow and drain grommets supplied separately as optional parts, where water drained from the outdoor unit is a problem.




○ There are 3 drain holes provided on the bottom plate of an outdoor unit to discharge condensed water.

○ When condensed water needs to be led to a drain, etc., install the unit on a flat base (supplied separately as an optional part) or concrete blocks.

○ Connect a drain elbow as shown in the illustration and close the other two drain holes with grommets.

## 4. ELECTRICAL WIRING WORK For details of electrical cabling, refer to the indoor unit installation manual.

Electrical installation work must be performed by an electrical installation service provider qualified by a power provider of the country. Electrical installation work must be executed according to the technical standards and other regulations applicable to electrical installations in the country.

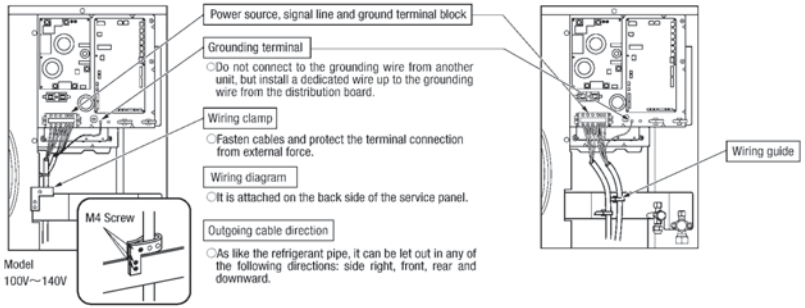
•Do not use any supply cord lighter than one specified in parentheses for each type below.
- braided cord (code designation 60245 IEC 51),
- ordinary tough rubber sheathed cord (code designation 60245 IEC 53)
- flat twin tinsel cord (code designation 60227 IEC 41);

Do not use anything lighter than polychloroprene sheathed flexible cord (code designation 60245 IEC57) for supply cords of parts of appliances for outdoor use.

•Ground the unit. Do not connect the grounding wire to a gas pipe, water pipe, lightning rod or telephone grounding wire. If improperly grounded, an electric shock or malfunction may result.

•A grounding wire must be connected before connecting the power cable. Provide a grounding wire longer than the power cable.

•The installation of an impulse withstanding type earth leakage breaker is necessary. A failure to install an earth leakage breaker can result in an acccident such as an electric shock or a fire.


Power source, signal line and ground terminal block
Grounding terminal
○Do not connect to the grounding wire from another unit, but install a dedicated wire up to the grounding wire from the distribution board.
Wiring clamp
○Fasten cables and protect the terminal connection from external force.
Wiring diagram
○It is attached on the back side of the service panel.
Outgoing cable direction
○As like the refrigerant pipe, it can be let out in any of the following directions: side right, front, rear and downward.
Wiring guide
M4 Screw
Model 100V~140V

| Model | Power source | Power cable thickness(mm²) | MAX. over current (A) | Cable length (m) | Grounding wire thickness | Indoor-outdoor wire thickness × number |
|---|---|---|---|---|---|---|
| 100VN~140VN | Single phase 3 wire 220-240V 50Hz 220V 60Hz | 5.5 | 24 | 25 | φ1.6mm | φ1.6mm x 3 |
| 100VNX | | | 26 | 23 | | |
| 125VNX,140VNX | | | | | | |
| 100VS~140VS | 3 phase 4 wire 380V 50Hz | 3.5 | 15 | 27 | | |
| 100VSX~140VSX | | | | | | |

●The specifications shown in the above table are for units without heaters. For units with heaters, refer to the installation instructions or the construction instructions of the indoor unit.

●Switchgear or Circuit breaker capacity which is calculated from MAX. over current should be chosen along the regulations in each country.

●The cable specifications are based on the assumption that a metal or plastic conduit is used with no more than three cables contained in a conduit and a voltage drop is 2%. For an installation falling outside of these conditions, follow the internal cabling regulations. Adapt it to the regulation in effect in each country.

•Do not turn on the power until the electrical work is completeted .

•Do not use a condensive capacitor for power factor improvement under any circumstances. (It dose not improve power factor, while it can cause an abnormal overheat accident)

•For power supply cables, use conduits.

•Do not lay electronic control cables (remote control and signaling wires) and other cables together outside the unit. Laying them together can result in the malfunctioning or a failure of the unit due to electric noises.

•Fasten cables so that may not touch the piping, etc.

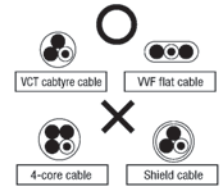
•When cables are connected, make sure that all electrical components within the electrical component box are free of loose connector coupling or terminal connection and then attach the cover securely. (Improper cover attachment can result in malfunctioning or a failure of the unit, if water penetrates into the box.)

•Always use a three-core cable for an indoor-outdoor connecting cable. Never use a shield cable.

● Connect a pair bearing a common terminal number with an indoor-outdoor connecting wire.

● In cabling, fasten cables securely with cable clamps so that no external force may work on terminal connections.

● Grounding terminals are provided in the control box.

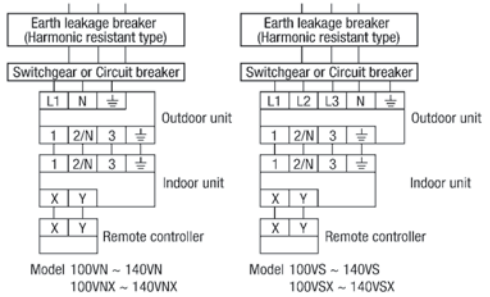



**Power cable, indoor-outdoor connecting wires**

● Always perform grounding system installation work with the power cord unplugged.

**⚠ CAUTION** Always use an earth leakage circuit breaker designed for inverter circuits to prevent a faulty operation.

※At the connection with the duct type indoor unit.




| Model | Power source | Power cable thickness(mm²) | MAX. over current (A) | Cable length (m) | Grounding wire thickness | Indoor-outdoor wire thickness × number |
|---|---|---|---|---|---|---|
| 100VN,100VNX | Single phase 3 wire 220-240V 50Hz 220V 60Hz | 5.5 | 25 | 24 | φ1.6mm | φ1.6mm x 3 |
| 125VN | | | 27 | 22 | | |
| 140VN | | 8 | 28 | 32 | | |
| 125VNX | | | 29 | 31 | | |
| 140VNX | | | 30 | 30 | | |
| 100VS,100VSX | 3 phase 4 wire 380-415V 50Hz 380V 60Hz | 3.5 | 16 | 26 | | |
| 125VS,125VSX | | | 18 | 23 | | |
| 140VS,140VSX | | | 19 | 21 | | |

# 5. TEST RUN

**⚠ WARNING**

- Before conduct a test run, do not fail to make sure that the operation valves are closed.
- Turn on power 6 hours prior to a test run to energize the crank case heater.
- In case of the first operation after turning on power, even if the unit does not move for 30 minutes, it is not a breakdown.
- Always give a 3-minute or longer interval before you start the unit again whenever it is stopped.
- Removing the service panel will expose high-voltage live parts and high-temperature parts, which are quite dangerous. Take utmost care not to incur an electric shock or burns. Do not leave the unit with the service panel open.

} A failure to observe these instructions can result in a compressor breakdown.

**⚠ CAUTION**

- When you operate switches (SW3, SW5) for on-site setting, be careful not to touch a live part.
- You cannot check discharge pressure from the liquid operation valve charge port.
- The 4-way valve (20S) is energized during a heating operation.
- When power supply is cut off to reset the unit, give 3 or more minutes before you turn on power again after power is cut off. If this procedure is not observed in turning on power again, "Communication error between outdoor and indoor unit" may occur.

## 1) Test run method

(1) A test run can be initiated from an outdoor unit by using SW3-3 and SW3-4 for on-site setting.
(2) Switching SW3-3 to ON will start the compressor.
(3) The unit will start a cooling operation, when SW3-4 is OFF, or a heating operation, when SW3-4 is ON.
(4) **Do not fail to switch SW3-3 to OFF when a test run is completed.**

| SW-3-3 | SW-3-4 | |
|---|---|---|
| ON | OFF | Cooling during a test run |
| | ON | Heating during a test run |
| OFF | — | Normal or After the test operation |

## 2) Checking the state of the unit in operation

Use check joints provided on the piping before and after the four-way valve installed inside the outdoor unit for checking discharge pressure and suction pressure.
As indicated in the table shown on the right, pressure detected at each point will vary depending on whether a cooling or heating operation has been selected.

| | Check joint of the pipe | Charge port of the gas operation valve |
|---|---|---|
| Cooling operation | Discharge pressure (High pressure) | Suction pressure (Low pressure) |
| Heating operation | Suction pressure (Low pressure) | Discharge pressure (High pressure) |

## 3) Setting SW3-1, SW3-2, on-site

(1) Defrost control switching (SW3-1)
- When this switch is turned ON, the unit will run in the defrost mode more frequently.
- Set this switch to ON, when installed in a region where outdoor temperature falls below zero during the season the unit is run for a heating operation.

(2) Snow guard fan control (SW3-2)
- When this switch is turned on, the outdoor unit fan will run for 10 seconds in every 10 minutes, when outdoor temperature falls to 3℃ or lower and the compressor is not running.
- When the unit is used in a very snowy country, set this switch to ON.

## 4) Failure diagnosis in a test run

| Error indicated on the remote control unit | Printed circuit board LED(The cycles of 5 seconds) | | Failure event | Action |
|---|---|---|---|---|
| | Red LED | Green LED | | |
| E34 | Blinking once | Blinking continuously | Open phase | Check power cables for loose contact or disconnection |
| E40 | Blinking once | Blinking continuously | 63H1 actuation or operation with operation valves shut (occurs mainly during a heating operation) | 1. Check whether the operation valves are open.<br>2. If an error has been canceled when 3 minutes have elapsed since a compressor stop, you can restart the unit by effecting Check Reset from the remote control unit. |
| E49 | Blinking once | Blinking continuously | Low pressure error or operation with operation valves shut (occurs mainly during a cooling operation) | |

- If an error code other than those listed above is indicated, refer to the wiring diagram of the outdoor unit and the indoor unit.

## 5) The state of the electronic expansion valve.

The following table illustrates the steady states of the electronic expansion valve.

| | When power is turned on | When the unit comes to a normal stop | | When the unit comes to an abnormal stop | |
|---|---|---|---|---|---|
| | | During a cooling operation | During a heating operation | During a cooling operation | During a heating operation |
| Valve for a cooling operation | Complete shut position | Complete shut position | Full open position | Full open position | Full open position |
| Valve for a heating operation | Full open position | Full open position | Complete shut position | Full open position | Full open position |

## 6) Heed the following on the first operation after turning on the circuit breaker.

This outdoor unit may start in the standby mode (waiting for a compressor startup), which can continue up to 30 minutes, to prevent the oil level in the compressor from lowering on the first operation after turning on the circuit breaker. If that is the case, do not suspect a unit failure.

**Items to checkbefore a test run**

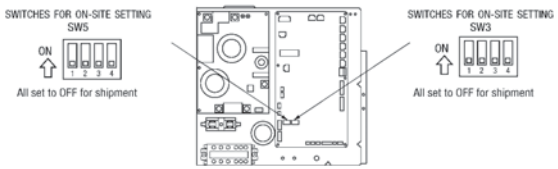
- When you leave the outdoor unit with power supplied to it, be sure to close the panel.

| Item No.used in the installation manual | Item | Check item | Check |
|---|---|---|---|
| 2 | Refrigerant plumbing | If brazed, was it brazed under a nitrogen gas flow? | |
| | | Were air-tightness test and vacuum extraction surely performed? | |
| | | Are heat insulation materials installed on both liquid and gas pipes? | |
| | | Are operation valves surely opened for both liquid and gas systems? | |
| | | Have you recorded the additional refrigerant charge volume and refrigerant pipe length on the panel's label? | |
| 4 | Electric wiring | Is the unit free of cabling errors such as uncompleted connection, an absent or reversed phase? | |
| | | Are properly rated electrical equipments used for circuit breakers and cables? | |
| | | Doesn't cabling cross-connect between units, where more than one unit are installed? | |
| | | Aren't indoor-outdoor signal wires connected to remote control wires? | |
| | | Do indoor-outdoor connecting cables connect between the same terminal numbers? | |
| | | Are either VCT cabtyre cables or WF flat cables used for indoor-outdoor connecting cables? | |
| | | Does grounding satisfy the D type grounding (type III grounding) requirements? | |
| | | Is the unit grounded with a dedicated grounding wire not connected to another unit's grounding wire? | |
| | | Are cables free of loose screws at their connection points? | |
| | | Are cables held down with cable clamps so that no external force works onto terminal connections? | |
| — | Indoor unit | Is indoor unit installation work completed? | |
| | | Where a face cover should be attached onto an indoor unit, is the face cover attached to the indoor unit? | |

**Test run procedure**

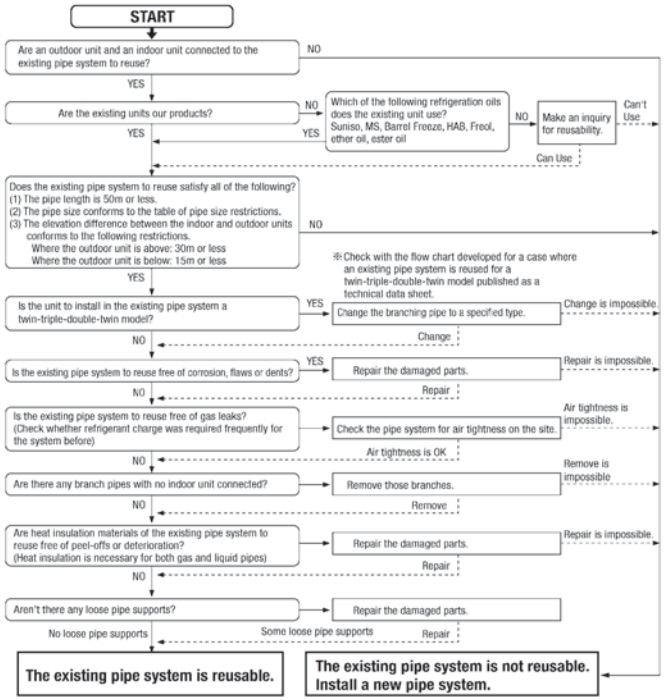
- Always carry out a test run and check the following in order as listed.

| Turn | The contents of operation | Check |
|---|---|---|
| ① | Open the gas side operation valve fully. | |
| ② | Open the liquid side operation valve fully. | |
| ③ | Close the panel. | |
| ④ | Where a remote control unit is used for unit setup on the installation site, follow instructions for unit setup on the installation site with a remote control unit. | |
| ⑤ | SW3-3 ON / SW3-4 OFF: the unit will start a cooling operation. | |
| | SW3-3 ON / SW3-4 ON: the unit will start a heating operation. | |
| ⑥ | When the unit starts operation, press the wind direction button provided on the remote control unit to check its operation. | |
| ⑦ | Place your hand before the indoor unit's diffuser to check whether cold (warm) winds come out in a cooling (heating) operation. | |
| ⑧ | Make sure that a red LED is not blinking. | |
| ⑨ | When you complete the test run, do not forget to turn SW3-3 to the OFF position. | |
| ⑩ | Where options are used, check their operation according to the respective instruction manuals. | |



# 6. UTILIZATION OF EXISTING PIPING.

Check whether an existing pipe system is reusable or not by using the following flow chart.


START
Are an outdoor unit and an indoor unit connected to the existing pipe system to reuse?
NO
YES
Are the existing units our products?
NO
YES
Which of the following refrigeration oils does the existing unit use? Suniso, MS, Barrel Freeze, HAB, Freol, ether oil, ester oil
NO
YES
Make an inquiry for reusability.
Can't Use
Can Use
Does the existing pipe system to reuse satisfy all of the following?
(1) The pipe length is 50m or less.
(2) The pipe size conforms to the table of pipe size restrictions.
(3) The elevation difference between the indoor and outdoor units conforms to the following restrictions.
Where the outdoor unit is above: 30m or less
Where the outdoor unit is below: 15m or less
NO
※Check with the flow chart developed for a case where an existing pipe system is reused for a twin-triple-double-twin model published as a technical data sheet.
YES
Is the unit to install in the existing pipe system a twin-triple-double-twin model?
YES
Change the branching pipe to a specified type.
Change is impossible.
Change
NO
Is the existing pipe system to reuse free of corrosion, flaws or dents?
YES
Repair the damaged parts.
Repair is impossible.
Repair
NO
Is the existing pipe system to reuse free of gas leaks? (Check whether refrigerant charge was required frequently for the system before)
Check the pipe system for air tightness on the site.
Air tightness is impossible.
Air tightness is OK
NO
Are there any branch pipes with no indoor unit connected?
Remove those branches.
Remove is impossible
Remove
NO
Are heat insulation materials of the existing pipe system to reuse free of peel-offs or deterioration? (Heat insulation is necessary for both gas and liquid pipes)
Repair the damaged parts.
Repair is impossible.
Repair
NO
Aren't there any loose pipe supports?
Repair the damaged parts.
No loose pipe supports
Some loose pipe supports
Repair
The existing pipe system is reusable.
The existing pipe system is not reusable. Install a new pipe system.

**⚠ WARNING** <Where the existing unit can be run for a cooling operation.>

**Carry out the following steps with the excising unit** (in the order of (1), (2), (3) and (4))

(1) Run the unit for 30 minutes for a cooling operation.
(2) Stop the indoor fan and run the unit for 3 minutes for a cooling operation (returning liquid)
(3) Close the liquid side operation valve of the outdoor unit and pump down (refrigerant recovery)
(4) Blow with nitrogen gas. ※ If discolored refrigeration oil or any foreign matters is discharged by the blow, wash the pipe system or install a new pipe system.
- For the flare nut, do not use the old one, but use the one supplied with the outdoor unit. Process a flare to the dimensions specified for R410A.
- **Turn on-site setting switch SW5-1** to the ON position. (Where the gas pipe size is φ19.05)

<Where the existing unit cannot be run for a cooling operation.>

Wash the pipe system or install a new pipe system.
- If you choose to wash the pipe system, contact our distributor in the area.

<Table of pipe size restrictions>

◎:Standard pipe size ○:Usable
△:Restricted to shorter pipe length limits ×:Not usable

| Additional charging amount of refrigerant per 1m | | 0.06kg/m | | 0.08kg/m | |
|---|---|---|---|---|---|
| Pipe size | Liquid pipe | φ9.52 | φ9.52 | φ12.7 | φ12.7 |
| | Gas pipe | φ15.88 | φ19.05 | φ15.88 | φ19.05 |
| 100VN 100VS | Usability | ◎ | ○※1 | △ | △※1 |
| | Maximum one-way pipe length | 50 | 50 | 25 | 25 |
| | Length covered without additional charge | 30 | 30 | 15 | 15 |
| 125VN 125VS | Usability | ◎ | ○※1 | △ | △※1 |
| | Maximum one-way pipe length | 50 | 50 | 25 | 25 |
| | Length covered without additional charge | 30 | 30 | 15 | 15 |
| 140VN 140VS | Usability | ◎ | ○※1 | △ | △※1 |
| | Maximum one-way pipe length | 50 | 50 | 25 | 25 |
| | Length covered without additional charge | 30 | 30 | 15 | 15 |

| Additional charging amount of refrigerant per 1m | | 0.02kg/m | 0.06kg/m | | 0.08kg/m | |
|---|---|---|---|---|---|---|
| Pipe size | Liquid pipe | φ6.35 | φ9.52 | φ9.52 | φ12.7 | φ12.7 |
| | Gas pipe | φ15.88 | φ15.88 | φ19.05 | φ15.88 | φ19.05 |
| 100VNX 100VSX | Usability | △ | ◎ | ○※1 | △ | △※1 |
| | Maximum one-way pipe length | 20 | 100 | 100 | 50 | 50 |
| | Length covered without additional charge | 10 | 30 | 30 | 15 | 15 |
| 125VNX 125VSX | Usability | △ | ◎ | ○※1 | △ | △※1 |
| | Maximum one-way pipe length | 20 | 100 | 100 | 50 | 50 |
| | Length covered without additional charge | 10 | 30 | 30 | 15 | 15 |
| 140VNX 140VSX | Usability | △ | ◎ | ○※1 | △ | △※1 |
| | Maximum one-way pipe length | 20 | 100 | 100 | 50 | 50 |
| | Length covered without additional charge | 10 | 30 | 30 | 15 | 15 |

<Pipe system after the branching pipe>

| Additional charging amount of refrigerant per 1m | | | After 1st branch ※4 | | | After 2nd branch | | |
|---|---|---|---|---|---|---|---|---|
| | | | 0.06kg/m | | | 0.06kg/m | | |
| Pipe size | Liquid pipe | | φ9.52 | | | φ9.52 | | |
| | Gas pipe | | φ12.7 | φ15.88 | φ19.05※1 | φ12.7 | φ15.88 | φ19.05※1 |
| Model | Combination type | Combination of capacity | | | | | | |
| 100V | Twin | 50+50 | ◎ | ○ | × | — | — | — |
| 125V | Twin | 60+60 | ◎ | ○ | × | — | — | — |
| 140V | Twin | 71+71 | × | ◎ | ○ | — | — | — |
| | Triple A | 50+50+50 | ◎ | ○ | × | — | — | — |
| | Triple B | 50+50+50 | × | ◎※5 | ○※5 | ◎ | ○ | × |

※1 Because of its insufficient pressure resistance, **turn the dip switch SW5-1** provided on the outdoor unit board to the ON position for φ19.05 × t1.0. (in the case of a twin-triple-double-twin model, this also applies to the case where φ19.05 × t1.0 is used in a pipe system after the first branching point.) However, you need not turn the dip switch SW5-1 to the ON position, if 1/2H pipes or pipes having 1.2 or thicker walls are used.

※2 When the main pipe length exceeds 40m, a significant capacity drop may be experienced due to pressure loss in the liquid pipe system. Use φ12.7 for the liquid main.

※3 Keep the total pipe length, not one-way pipe length, below the specified maximum pipe length.

※4 Piping size after branch should be equal or smaller than main pipe size.

※5 Piping size from first branch to indoor unit should be φ9.52 (Liquid) / φ12.7 (Gas).

- When refrigerant piping is shoter than 3m, reduce refrigerant by 1kg from factory charged volume.
- Any combinations of pipe sizes not listed in the table or marked with × in the table are not usable.

<The model types of existing units of which branching pipes are reusable.>

Models later than Type 8.
- FDC＊＊＊8□□□
- FDCP＊＊＊8□□□

**The branching pipes used with models other than those listed above are not reusable because of their insufficient pressure resistance. Please use our genuine branching pipes for R410A.**

- ＊＊＊ are numbers representing horsepower. □□□ is an alphanumeric letter.

Formula to calculate additional charge volume

Additional charge volume (kg) = {Main pipe length (m) − Length covered without additional charge shown in the table (m)} × Additional charge volume per meter of pipe shown in the table (kg/m) + Total length of branch pipes (m) × Additional charge volume per meter of pipe shown in the table (kg/m)

※ If you obtain a negative figure as a result of calculation, no additional refrigerant needs to be charged.
**Example)** When an 140V (single installation) is installed in a 20m long existing pipe system (liquid φ12.7, gas φ19.05), the quantity of refrigerant to charge additionally should be (20m-15m) x 0.08kg/m = 0.4 kg.

PSB012D966

## 5.4 Electric wiring work installation

Electrical wiring work must be performed by an electrician qualified by a local power provider according to the electrical installation technical standards and interior wiring regulations applicable to the installation site.

### Security instructions

- **Read the "SAFETY PRECAUTIONS" carefully first of all and then strictly follow it during the installation work in order to protect yourself.**
- **The precautionary items mentioned below are distinguished into two levels, ⚠WARNING and ⚠CAUTION .**
  **⚠WARNING : Wrong installation would cause serious consequences such as injuries or death.**
  **⚠CAUTION : Wrong installation might cause serious consequences depending on circumstances.**
  **Both mentions the important items to protect your health and safety so strictly follow them by any means.**
- **The meanings of "Marks" used here are as shown on the right:**
  ⃠ Never do it under any circumstances. ❶ Always do it according to the instruction.
- **Accord with following items. Otherwise, there will be the risks of electric shock and fire caused by overheating or short circuit.**

#### ⚠WARNING

- **Be sure to have the electrical wiring work done by qualified electrical installer, and use exclusive circuit.**
  Power source with insufficient capacity and improper work can cause electric shock and fire.
- **Use specified wire for electrical wiring, fasten the wiring to the terminal securely, and hold the cable securely in order not to apply unexpected stress on the terminal.**
  Loose connections or hold could result in abnormal heat generation or fire.
- **Arrange the electrical wires in the control box properly to prevent them from rising. Fit the lid of the services panel property.**
  Improper fitting may cause abnormal heat and fire.
- **Use the genuine optional parts. And installation should be performed by a specialist.**
  If you install the unit by yourself, it could cause water leakage, electric shock and fire.
- **Do not repair by yourself. And consult with the dealer about repair.**
  Improper repair may cause water leakage, electric shock or fire.
- **Consult the dealer or a specialist about removal of the air conditioner.**
  Improper installation may cause water leakage, electric shock or fire.
- **Turn off the power source during servicing or inspection work.**
  If the power is supplied during servicing or inspection work, it could cause electric shock and injury by the operating fan.
- **Shut off the power before electrical wiring work.**
  It could cause electric shock, unit failure and improper running.

#### ⚠CAUTION

- **Perform earth wiring surely.**
  Do not connect the earth wiring to the gas pipe, water pipe, lightning rod and telephone earth wiring. Improper earth could cause unit failure and electric shock due to a short circuit.
- **Earth leakage breaker must be installed.**
  If the earth leakage breaker is not installed, it can cause electric shocks.
- **Make sure to install earth leakage breaker on power source line. (countermeasure thing to high harmonics.)**
  Absence of breaker could cause electric shock.
- **Use the circuit breaker of correct capacity. Circuit breaker should be the one that disconnect all poles under over current.**
  Using the incorrect one could cause the system failure and fire.
- **Do not use any materials other than a fuse of correct capacity where a fuse should be used.**
  Connecting the circuit by wire or copper wire could cause unit failure and fire.
- **Use power source line of correct capacity.**
  Using incorrect capacity one could cause electric leak, abnormal heat generation and fire.
- **Do not mingle solid cord and stranded cord on power source and signal side terminal block.**
  In addition, do not mingle difference capacity solid or stranded cord.
  Inappropriate cord setting could cause loosing screw on terminal block, bad electrical contact, smoke and fire.
- **Do not turn off the power source immediately after stopping the operation.**
  Be sure to wait for more than 5 minutes. Otherwise it could cause water leakage or breakdown.
- **Do not control the operation with the circuit breaker.**
  It could cause fire or water leakage. In addition, the fan may start operation unexpectedly and it may cause injury.

### ①Electrical Wiring Connection

- Use three-core cable as wiring between indoor and outdoor unit. As for detail, refer to "INSTALLATION MANUAL" of outdoor Unit.
- Set earth of D-type.
- Keep "remote controller line" and "power source line" away from each other on constructing of unit outside.
- Run the lines (power source, remote controller and "between indoor and outdoor unit") upper ceiling through iron pipe or other tube protection to avoid the damage by mouse and so on.
- Do not add cord in the middle of line route (of power source, remote controller and "between indoor and outdoor unit") on outside of unit. If connecting point is flooded, it could cause problem as for electric or communication. (In the case that it is necessary to set connecting point on the way, perform thorough waterproof measurement.)
- Do not connect the power source line [220V/240V/380V/415V] to signal side terminal block. Otherwise, it could cause failure.
- Screw the line to terminal block without any looseness, certainly.
- Do not turn on the switch of power source, before all of line work is done.
- Connection of the line ("Between indoor and outdoor unit", Earth and Remote controller)

①Remove lid of control box before connect the above lines, and connect the lines to terminal block according to number pointed on label of terminal block.
In addition, pay enough attention to confirm the number to lines, because there is electrical polarity except earth line. Furthermore, connect earth line to earth position of terminal block of power source.

②Install earth leakage breaker on power source line. In addition, select the type of breaker for inverter circuit as earth leakage breaker.

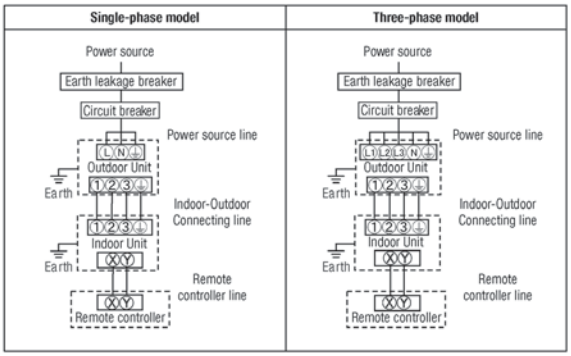
③If the function of selected earth leakage breaker is only for earth-fault protection, hand switch (switch itself and type "B" fuse) or circuit breaker is required in series with the earth leakage breaker.

④Install isolator or disconnect switch on the power supply wiring in accordance with the local codes and regulations.
The isolator should be set in the box with key to prevent touching by another person when servicing.

### Cable connection for single unit installation

①As for connecting method of power source, select from following connecting patterns. In principle, do not directly connect power souce line to inside unit.
※As for exceptional connecting method of power souce, discuss with the power provider of the country with referring to technical documents, and follow its instruction.

②For cable size and circuit breaker selection, refer to the outdoor unit installation manual.



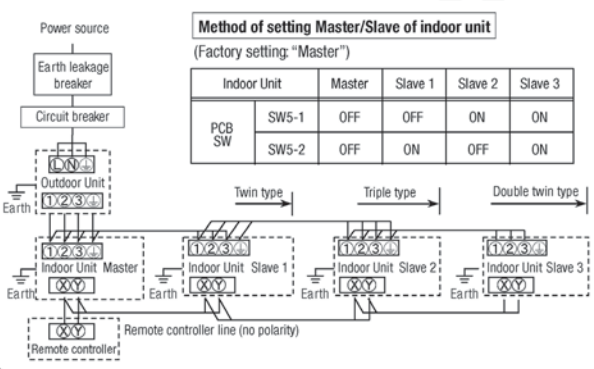

### Cable connection for a V multi configuration installation

①Connect the same pairs number of terminal block "①, ②, and ③"and " ⓧ and Ⓨ " between master and slave indoor units.

②Do the same address setting of all inside units belong to same refrigerant system by rotary switch SW2 on indoor unit's PCB (Printed circuit board).

③Set slave indoor unit as "slave 1" through "slave 3" by address switch SW5-1, 5-2 on PCB.

④When the AIR CON NO. button on the remote control unit is pressed after turning on the power, an indoor unit's address number will be displayed. Do not fail to confirm that the connected indoor unit's numbers are displayed on the remote control unit by pressing the ▲ or ▼ button.




**Method of setting Master/Slave of indoor unit**
(Factory setting: "Master")

| Indoor Unit | | Master | Slave 1 | Slave 2 | Slave 3 |
|---|---|---|---|---|---|
| PCB SW | SW5-1 | OFF | OFF | ON | ON |
| | SW5-2 | OFF | ON | OFF | ON |

## ②Remote Control, Wiring and functions

●DO NOT install it on the following places
①Places exposed to direct sunlight
②Places near heat devices
③High humidity places
④Hot surface or cold surface enough to generate condensation
⑤Places exposed to oil mist or steam directly.
⑥Uneven surface

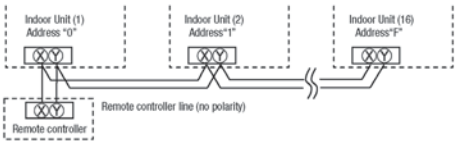
### Installation and wiring of remote controller

①Install remote controller referring to the attached installation manual.
②Wiring of remote controller should use 0.3mm² ×2 core wires or cables.
The insulation thickness is 1mm or more. (on-site configuration)
③Maximum prolongation of remote control wiring is 600 m.
If the prolongation is over 100m, change to the size below.
But, wiring in the remote controller case should be under 0.5mm² . Change the wire size outside of the case according to wire connecting. Waterproof treatment is necessary at the wire connecting section. Be careful about contact failure.
100 - 200m ..... 0.5mm² × 2 cores
Under 300m ..... 0.75mm² × 2 cores
Under 400m ..... 1.25mm² × 2 cores
Under 600m ..... 2.0mm² × 2 cores
④Avoid using multi-core cables to prevent malfunction.
⑤Keep remote controller line away from earth (frame or any metal of building).
⑥Make sure to connect remote controller line to the remote controller and terminal block of indoor unit. (No polarity)

### Control plural indoor units by a single remote controller.

①A remote controller can control plural indoor units (Up to 16).
In above setting, all plural indoor units will operate under same mode and temperature setting.
②Connect all indoor units with 2 core remote controller line.
③Set unique remote control communication address from "0" to "F" to each inside unit by the rotary switch SW2 on the indoor unit's PCB.

**After a unit is energized, it is possible to display an indoor unit address by pressing AIR CON NO. button on the remote control unit. Press the ▲ or ▼ button to make sure that all indoor units connected are displayed in order.**



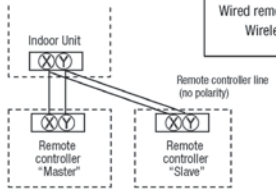

### Confirming method of indoor units

When indoor unit address number is displayed on remote controller, pushing the (MODE) button to make the indoor unit with that number blow air (Display example:" I/U001 ≋ ")
Push the (MODE) button again to stop the operation.
However, this operation is invalid on the air-conditioning running.

### Master/ slave setting when more than one remote control unit are used

A maximum of two remote control units can be connected to one indoor unit (or one group of indoor units.)
The air conditioner operation follows the last operation of the remote controller regardless of the master/slave setting of it.
Acceptable combination is "two (2) wired remote controllers", "one (1) wired remote controller and one (1) wireless kit" or "two (2) wireless kits".
Set SW1 (wired remote controller) or SW1-2 (wireless kit) to "Slave" for the slave remote control unit. It was factory set to "Master" for shipment.
Note:The setting "Remote control unit sensor enabled" is only selectable with the master remote control unit in the position where you want to check room temperature.

| Switch | setting | contents |
|---|---|---|
| Wired remote controller: SW1<br>Wireless kit: SW1-2 | M | Master remote controller |
| | S | Slave remote controller |




## ③Trial operation

### The method of trial cooling operation

Operate the remote control unit as follows.
1. Starting a cooling test run.
①Start the system by pressing the ON/OFF button.
②Select " (Cool)" with the (MODE) button.
③Press the TEST button for 3 seconds or longer.
The screen display will switch to: " TEST RUN ▼ "
④When the (SET) button is pressed while " TEST RUN ▼ " is indicated, a cooling test run will start.
The screen display will switch to " TEST RUN ".
2. Ending a cooling test run.
Pressing the ON/OFF button, the (TEMP) button or (MODE) button will end a cooling test run. (Cooling test run will end after 30 minutes pass.)
" TEST RUN " shown on the screen will go off.

### Checking operation data

Operation data can be checked with remote control unit operation.
1. Press the CHECK button.
The display change " OPER DATA ▼ "
2. Press the (SET) button while " OPER DATA ▼ " is displayed.
3. When only one indoor unit is connected to remote controller, " DATA LOADING" is displayed (blinking indication during data loading).
Next, operation data of the indoor unit will be displayed. Skip to step 7.
4. When plural indoor units is connected, the smallest address number of indoor unit among all connected indoor unit is displayed.
[Example]:
"SELECT I/U" (blinking 1 seconds)→
"I/U000 ▲" blinking.
5. Select the indoor unit number you would like to have data displayed with the ▲ ▼ button.
6. Determine the indoor unit number with the (SET) button.
(The indoor unit number changes from blinking indication to continuous indication)
" I/U000 " (The address of selected indoor unit is blinking for 2 seconds.)
↓
" DATA LOADING " (A blinking indication appears while data loaded.)
Next, the operation data of the indoor unit is indicated.
7. Upon operation of the ▲ ▼ button, the current operation data is displayed in order from data number 01.
The items displayed are in the above table.
※Depending on models, the items that do not have corresponding data are not displayed.
8. To display the data of a different indoor unit, press the AIR CON NO. button, which allows you to go back to the indoor unit selection screen.
9. Pressing the ON/OFF button will stop displaying data.
Pressing the (RESET) button during remote control unit operation will undo your last operation and allow you to go back to the previous screen.

| Number | Data Item | |
|---|---|---|
| 01 | | (Operation Mode) |
| 02 | SET TEMP | (Set Temperature) |
| 03 | RETURN AIR | (Return Air Temperature) |
| 04 | SENSOR | (Remote Controller Thermistor Temperature) |
| 05 | THI-R1 | (Indoor Unit Heat Exchanger Thermistor / U Bend) |
| 06 | THI-R2 | (Indoor Unit Heat Exchanger Thermistor /Capillary) |
| 07 | THI-R3 | (Indoor Unit Heat Exchanger Thermistor /Gas Header) |
| 08 | I/U FANSPEED | (Indoor Unit Fan Speed) |
| 09 | DEMAND Hz | (Frequency Requirements) |
| 10 | ANSWER Hz | (Response Frequency) |
| 11 | I/U EEV P | (Pulse of Indoor Unit Expansion Valve) |
| 12 | TOTAL I/U RUN H | (Total Running Hours of The Indoor Unit) |
| 21 | OUTDOOR | (Outdoor Air Temperature) |
| 22 | THO-R1 | (Outdoor Unit Heat Exchanger Thermistor) |
| 23 | THO-R2 | (Outdoor Unit Heat Exchanger Thermistor) |
| 24 | COMP Hz | (Compressor Frequency) |
| 25 | HP MPa | (High Pressure) |
| 26 | LP MPa | (Low Pressure) |
| 27 | Td | (Discharge Pipe Temperature) |
| 28 | COMP BOTTOM | (Comp Bottom Temperature) |
| 29 | CT AMP | (Current) |
| 30 | TARGET SH | (Target Super Heat) |
| 31 | SH | (Super Heat) |
| 32 | TDSH | (Discharge Pipe Super Heat) |
| 33 | PROTECTION No. | (Protection State No. of The Compressor) |
| 34 | O/U FANSPEED | (Outdoor Unit Fan Speed) |
| 35 | 63H1 | (63H1 On/Off) |
| 36 | DEFROST | (Defrost Control On/Off) |
| 37 | TOTAL COMP RUN H | (Total Running Hours of The Compressor) |
| 38 | O/U EEV1 P | (Pulse of The Outdoor Unit Expansion Valve EEVC) |
| 39 | O/U EEV2 P | (Pulse of The Outdoor Unit Expansion Valve EEVH) |

※Depending on outdoor unit model, there are data not shown.

◎If two (2) remote controllers are connected to one (1) inside unit, only the master controller is available for trial operation and confirmation of operation data. (The slave remote controller is not available.)

### Trail operation of drain pump

Drain pump operation from remote control unit is possible. Operate a remote control unit by following the steps described below.
1. To start a forced drain pump operation.
①Press the TEST button for three seconds or longer.
The display will change " TEST RUN ▼ "
②Press the ▼ button once and cause " DRAIN PUMP " to be displayed.
③When the (SET) button is pressed, a drain pump operation will start.
Display: " TO STOP "
2. To cancel a drain pump operation.
①If either (SET) or ON/OFF button is pressed, a forced drain pump operation will stop. The air conditioning system will become OFF.

◎If two (2) remote controllers are connected to one (1) inside unit, only the master controller is available for trial operation and confirmation of operation data. (The slave remote controller is not available.)

## ④Function Setting by Remote Controller

### The functional setting

● The initial function setting for typical using is performed automatically for a remote control unit and an indoor unit by the door unit connected, when remote controller and inside unit are connected.
As long as they are used in a typical manner, there will be no need to change the initial settings.
If you would like to change the initial setting marked " ○ ", set your desired setting as for the selected item.
The procedure of functional setting is shown as the following diagram.
As for detail of setting, refer to the installation manual of remote controller.

**[Flow of function setting]**

Start : While indoor unit do not operate, press " ○ " (SET) and " ◌ " (MODE) button for 3 seconds at the same time.
Finalize : Press " ○ " (SET) button.
Reset : Press " ⌀ " (RESET) button.
Select : Press ▲ ▼ button.
End : Press ⏻ON/OFF button.
It is possible to finish above setting on the way, and unfinished change of setting is unavailable.
" ○ " : Initial settings
" ※ " : Automatic criterion
As for detail, refer to the installation manual of remote controller.

During air-conditioner stopping push (SET) + (MODE) button simultaneously for 3 seconds → FUNCTION SET ▼

Consult the technical data etc for each control details

Record and save the setting

FUNCTION ▼ (Remote controller function)

| Function | setting | | |
|---|---|---|---|
| 01 GRILLE ↑↓ SET | | | |
| | ↑↓ INVALID | ○ | |
| | 50Hz ZONE ONLY | | When you use at 50Hz area |
| | 60Hz ZONE ONLY | | When you use at 60Hz area |
| 02 AUTO RUN SET | | | |
| | AUTO RUN ON | ※ | |
| | AUTO RUN OFF | ※ | Automatic operation is impossible |
| 03 TEMP SW | | | |
| | TEMP VALID | ○ | |
| | TEMP INVALID | | Temperature setting button is not working |
| 04 MODE SW | | | |
| | MODE VALID | ○ | |
| | MODE INVALID | | Mode button is not working |
| 05 ON/OFF SW | | | |
| | ON/OFF VALID | ○ | |
| | ON/OFF INVALID | | On/Off button is not working |
| 06 FAN SPEED SW | | | |
| | FAN VALID | ※ | |
| | FAN INVALID | ※ | Fan speed button is not working |
| 07 LOUVER SW | | | |
| | LOUVER VALID | ※ | |
| | LOUVER INVALID | ※ | Louver button is not working |
| 08 TIMER SW | | | |
| | TIMER VALID | ○ | |
| | TIMER INVALID | | Timer button is not working |
| 09 SENSOR SET | | | |
| | SENSOR OFF | ○ | Remote thermistor is not working. |
| | SENSOR ON | | Remote thermistor is working. |
| | SENSOR +3.0℃ | | Remote thermistor is working, and to be set for producing +3.0°C increase in temperature. |
| | SENSOR +2.0℃ | | Remote thermistor is working, and to be set for producing +2.0°C increase in temperature. |
| | SENSOR +1.0℃ | | Remote thermistor is working, and to be set for producing +1.0°C increase in temperature. |
| | SENSOR -1.0℃ | | Remote thermistor is working, and to be set for producing -1.0°C increase in temperature. |
| | SENSOR -2.0℃ | | Remote thermistor is working, and to be set for producing -2.0°C increase in temperature. |
| | SENSOR -3.0℃ | | Remote thermistor is working, and to be set for producing -3.0°C increase in temperature. |
| 10 AUTO RESTART | | | |
| | INVALID | ○ | |
| | VALID | | |
| 11 VENT LINK SET | | | |
| | NO VENT | ○ | |
| | VENT LINK | | Connect the Single split series and the VRF series to the indoor board CNT and indoor board CND respectively. If a ventilation device is connected, been geared with the motion of indoor device, the ventilation device is operated/stopped. By connecting the ventilation device with the Single split series device to indoor board CNT, the VRF series device to CND, you can operate/stop the ventilation device independently by the handling of ventilation button. |
| | NO VENT LINK | | |
| 12 TEMP RANGE SET | | | |
| | INDIV CHANGE | ○ | If you change the range of set temperature, the indication of set temperature will vary following the control. |
| | NO INDIV CHANGE | | If you change the range of set temperature, the indication of set temperature will not vary following the control, and keep the set temperature. |
| 13 I/U FAN | | | |
| | HI-MID-LO | ※ | Airflow of fan becomes the three speed of ■■■ - ■■□ - ■□□ or ■■■■ - ■■■ - ■■□ - ■□□ . |
| | HI-LO | ※ | Airflow of fan becomes the two speed of ■■■ - ■□□ . |
| | HI-MID | | Airflow of fan becomes the two speed of ■■■ - ■■□ . |
| | 1 FAN SPEED | ※ | Airflow of fan is fixed at one speed. |
| 14 POSITION | | | If you want to change the remote control function "14 POSITION", You must change the indoor function "04 POSITION" accordingly. |
| | 4POSITION STOP | ○ | You can select the louver stop position in the four. |
| | FREE STOP | | The louver can stop at any position. |
| 15 MODEL TYPE | | | |
| | HEAT PUMP | ※ | |
| | COOLING ONLY | ※ | |
| 16 EXTERNAL CONTROL SET | | | |
| | INDIVIDUAL | ○ | If you input into the indoor printed circuit board CNT from outside, the indoor device will be operated independently following the input from outside. |
| | FOR ALL UNITS | | If you input into indoor printed circuit board CNT from outside, All units which share the same one remote control network work following the input from outside. |
| 17 ROOM TEMP INDICATION SET | | | |
| | INDICATION OFF | ○ | |
| | INDICATION ON | | In normal working indication, indoor unit temperature is indicated instead of airflow. (Only the master remote control can be indicated. ) |
| 18 HEATING INDICATION | | | |
| | INDICATION ON | ○ | |
| | INDICATION OFF | | Heating preparation indication should not be indicated. |
| 19 ℃/℉ SET | | | |
| | ℃ | ○ | Temperature indication is by degree C |
| | ℉ | | Temperature indication is by degree F |

ON/OFF button (finished)

Note 1: The initial setting marked " ※ " is decided by connected indoor and outdoor unit, and is automatically defined as following table.

| Function No. | Item | Default | Model |
|---|---|---|---|
| Function 02 of remote controller | AUTO RUN SET | AUTO RUN ON | "Auto-RUN" mode selectable indoor unit. |
| | | AUTO RUN OFF | Indoor unit without "Auto-RUN" mode |
| Function 06 of remote controller | FAN SPEED SW | VALID | Indoor unit with two or three step of air flow setting |
| | | INVALID | Indoor unit with only one of air flow setting |
| Function 07 of remote controller | LOUVER SW | VALID | Indoor unit with automatically swing louver |
| | | INVALID | Indoor unit without automatically swing louver |
| Function 13 of remote controller | I/U FAN | HI-MID-LO | Indoor unit with three step of air flow setting |
| | | HI-LO | Indoor unit with two step of air flow setting |
| | | HI-MID | |
| | | 1 FAN SPEED | Indoor unit with only one of air flow setting |
| Function 15 of remote controller | MODEL TYPE | HEAT PUMP | Heat pump unite |
| | | COOLING ONLY | Exclusive cooling unite |

Note 2: Fan setting of "HIGH SPEED"

| Fan tap | | Indoor unit air flow setting | | | |
|---|---|---|---|---|---|
| | | ■■■■ - ■■■■ - ■■■■ - ■■■■ | ■■■■ - ■■■■ - ■■■■ | ■■■■ - ■■■■ | ■■■■ - ■■■■ |
| FAN SPEED SET | STANDARD | UH - Hi - Me - Lo | Hi - Me - Lo | Hi - Lo | Hi - Me |
| | HIGH SPEED1, 2 | UH - UH - Hi - Me | UH - Hi - Me | UH - Me | UH - Hi |

Initial function setting of some indoor unit is "HIGH SPEED"

Note 3: As for plural indoor unit, set indoor functions to each master and slave indoor unit.
But only master indoor unit is received the setting change of indoor unit function "05 EXTERNAL INPUT" and "06 PERMISSION / PROHIBISHION".

(Indoor unit function) I/U FUNCTION ▲

Only when plural indoor units are connected
Indoor No. selection
(Note3)

I/0000 ▲
I/0001 ◆
I/0002 ◆
I/0003 ◆
I/0004 ◆

If to change re-set with other indoor unit, push AIRCON NO. button, and indoor selection indication (for example: I/U 000) is set back.

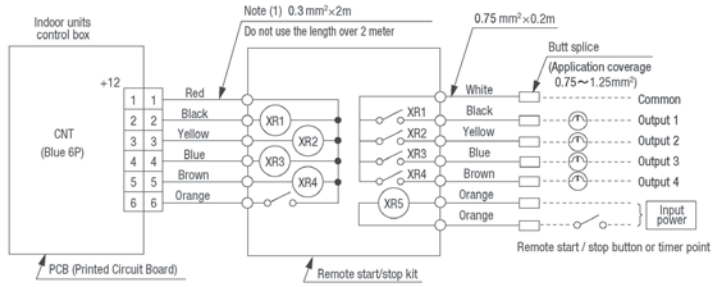
| Function | setting | | |
|---|---|---|---|
| 02 FAN SPEED SET | | | |
| | STANDARD | ○ | (Note2) |
| | HIGH SPEED 1 | | |
| | HIGH SPEED 2 | | |
| 03 FILTER SIGN SET | | | |
| | INDICATION OFF | | |
| | TYPE 1 | ○ | The filter sign is indicated after running for 180 hours. |
| | TYPE 2 | | The filter sign is indicated after running for 600 hours. |
| | TYPE 3 | | The filter sign is indicated after running for 1000 hours. |
| | TYPE 4 | | The filter sign is indicated after running for 1000 hours, then it will be stopped by compulsion after 24 hours. |
| 04 ■■■■ POSITION | | | If to change the indoor function "04 ■■■■ POSITION ", The remote control function "14 ■■■■ POSITION " should be changed accordingly. |
| | 4POSITION STOP | ○ | Select the louver stop position in four. |
| | FREE STOP | | The louver can stop at any positon. |
| 05 EXTERNAL INPUT | | | |
| | LEVEL INPUT | ○ | |
| | PULSE INPUT | | |
| 06 ■■■■■■■■■■■■ | | | |
| | INVALID | ○ | |
| | VALID | | Make permission/prohibition control of function be in effect. |
| 07 EMERGENCY STOP | | | |
| | INVALID | ○ | |
| | VALID | | With the VRF series, it is used to stop all indoor units connected with the same outdoor unit immediately. When stop signal is inputed from remote on-off terminal "CNT-6", all indoor units are stopped immediately. |
| 08 ※ SP OFFSET | OFFSET +3.0℃ | | To be reset for producing +3.0°C increase in temperature during heating. |
| | OFFSET +2.0℃ | | To be reset for producing +2.0°C increase in temperature during heating. |
| | OFFSET +1.0℃ | | To be reset for producing +1.0°C increase in temperature during heating. |
| | NO OFFSET | ○ | |
| 09 RETURN AIR TEMP | OFFSET +2.0℃ | | To be reset producing +2.0°C increase in return air temperature of indoor unit. |
| | OFFSET +1.5℃ | | To be reset producing +1.5°C increase in return air temperature of indoor unit. |
| | OFFSET +1.0℃ | | To be reset producing +1.0°C increase in return air temperature of indoor unit. |
| | NO OFFSET | ○ | |
| | OFFSET -1.0℃ | | To be reset producing -1.0°C increase in return air temperature of indoor unit. |
| | OFFSET -1.5℃ | | To be reset producing -1.5°C increase in return air temperature of indoor unit. |
| | OFFSET -2.0℃ | | To be reset producing -2.0°C increase in return air temperature of indoor unit. |
| 10 ※ FAN CONTROL | | | |
| | LOW FAN SPEED | ○ | When heating thermostat is off, to be operated with low air flow. |
| | SET FAN SPEED | | When heating thermostat is off, to be operated with set air flow. |
| | INTERMITTENCE | | When heating thermostat is off, to be operated intermittently. |
| | FAN OFF | | When heating thermostat is off, the fan stops. When the remote thermistor is working, "FAN OFF" is set automatically. Do not set when the indoor unit's thermistor is working. |
| 11 FROST PREVENTION TEMP | | | Change of indoor heat exchanger temperature to start frost prevention control. |
| | TEMP HIGH | | |
| | TEMP LOW | ○ | |
| 12 FROST PREVENTION CONTROL | | | Working only with the single split series. |
| | FAN CONTROL ON | ○ | To control frost prevention, the indoor fan tap is raised. |
| | FAN CONTROL OFF | | |
| 13 DRAIN PUMP LINK | | | |
| | ■■■ | ○ | Drain pump is on during cooling and dry. |
| | ■■■AND■■ | | Drain pump is on during cooling, dry and heating. |
| | ■■■AND■■AND■■ | | Drain pump is on during cooling, dry, heating and fan. |
| | ■■■AND■■ | | Drain pump is on during cooling, dry and fan. |
| 14 ■■ FAN REMAINING | | | |
| | NO REMAINING | ○ | After cooling is stopped or cooling thermostat is off, the fan does not perform extra operation. |
| | 0.5 HOUR | | After cooling is stopped or cooling thermostat is off, the fan perform extra operation for half an hour. |
| | 1 HOUR | | After cooling is stopped or cooling thermostat is off, the fan perform extra operation for an hour. |
| | 6 HOUR | | After cooling is stopped or cooling thermostat is off, the fan perform extra operation for six hours. |
| 15 ※ FAN REMAINING | | | |
| | NO REMAINING | ○ | After heating is stopped or heating thermostat is off, the fan does not perform extra operation. |
| | 0.5 HOUR | | After heating is stopped or heating thermostat is off,the fan perform extra operation for half an hour. |
| | 2 HOUR | | After heating is stopped or heating thermostat is off,the fan perform extra operation for two hours. |
| | 6 HOUR | | After heating is stopped or heating thermostat is off, the fan perform extra operation for six hours. |
| 16 ※ FAN INTERMITTENCE | | | |
| | NO REMAINING | ○ | |
| | 20minOFF 5minON | | During heating is stopped or heating thermostat is off, the fan perform intermittent operation for five minutes after twenty minutes' off with low airflow. |
| | 5minOFF 5minON | | During heating is stopped or heating thermostat is off, the fan perform intermittent operation for five minutes after five minutes' off with low airflow. |

## ⑤Control mode switching

●The control content of indoor units can be switched in following way. ( ☐ is the default setting)

| Switch No. | Control Content | |
|---|---|---|
| SW2 | Indoor unit address (0-Fh) | |
| SW5-1 | Master/Slave Switching (plural /Slave unit Setting) | |
| SW5-2 | | |
| SW6-1～4 | Model capacity setting | |
| SW7－1 | ON | Operation check, Drain motor test run |
| | OFF | Normal operation |

## ⑥Function of CNT connector of indoor printed circuit board




●CNT connector (local) vendor model
Connector : Made by molex 5264 - 06
Terminals : Made by molex 5263T

●Function

| | |
|---|---|
| Output 1 | Operation output (there is output when unit is in operation.) |
| Output 2 | Heating output (there is output when operation MODE is HEATING.) |
| Output 3 | Compressor ON output (there is output when compressor is in operation.) |
| Output 4 | Inspection output (there is output when unit is stopped by error.) |
| Input 5 | Remote operation input (Volt-free contact) (Inputted to operate unit) |

## ⑦Troubleshooting

The operation data is saved when the situation of abnormal operation happen, and the data can be confirmed by remote controller.

[Operating procedure]

1. Press the CHECK button.
   The display change " OPER DATA ▼ "
2. Once, press the ▼ button, and the display change " ERROR DATA ▲ ".
3. Press the ○ (SET) button and abnormal operation data mode is started.
4. When only one indoor unit is connected to remote controller, following is displayed.
   ①The case that there is history of abnormal operation.
   →Error code and " DATA LOADING " is displayed.
   [Example]: [E8] (ERROR CODE)
   " DATA LOADING " is displayed (blinking indication during data loading).
   Next, the abnormal operation data of the indoor unit will be displayed.
   Skip to step 8.
   ②The case that there is not history of abnormal operation.
   →" NO ERROR " is displayed for 3 seconds and this mode is closed.
5. When plural indoor units is connected, following is displayed.
   ①The case that there is history of abnormal operation.
   →Error code and the smallest address number of indoor unit among all connected indoor unit is displayed.
   [Example]: [E8] (ERROR CODE)
   " I/U000 ▲ " blinking
   ②The case that there is not history of abnormal operation.
   →Only address number is displayed.
6. Select the indoor unit number you would like to have data displayed with the ▲ ▼ button.
7. Determine the indoor unit number with the ○ (SET) button.
   [Example]: [E8] (ERROR CODE)
   " I/U000 ▲ " (The address of selected indoor unit is blinking for 2 seconds.)
   ↓
   [E8] " DATA LOADING " (A blinking indication appears while data loaded.)
   Next, the abnormal operation data is indicated.
   If the indoor unit doing normal operation is selected, NO ERROR " is displayed for 3 seconds and address of indoor unit is displayed.
8. By the ▲ ▼ button, the abnormal operation data is displayed.
   Displayed data item is based on ③Trial operation .
   ※Depending on models, the items that do not have corresponding data are not displayed.
9. To display the data of a different indoor unit, press the AIR CON No. button, which allows you to go back to the indoor unit slection screen.
10. Pressing the ①ON/OFF button will stop displaying data.

**Pressing the ◇ (RESET) button during remote control unit operation will undo your last operation and allow you to go back to the previous screen.**

◎If two (2) remote controllers are connected to one (1) indoor unit, only the master controller is available for trial operation and confirmation of operation data. (The slave remote controller is not available.)

### Error Code of indoor unit

| Display on remote controller | LED on indoor circuit board | | Content |
|---|---|---|---|
| | red (checking) | green (normal) | |
| Off | Off | Continuous blinking | Normal |
| | Off | Off | Fault on power, indoor power off or lack phase |
| E1 | Off | Continuous blinking | Fault on the transmission between indoor circuit board and remote control |
| | Not sure | Not sure | Indoor computer abnormal |
| E5 | Blinking twice | Continuous blinking | Fault on outdoor-indoor transmission |
| E6 | Blinking once | Continuous blinking | Indoor heat exchange sensor interrupted or short-circuit |
| E7 | Blinking once | Continuous blinking | Indoor air inhaling sensor broken or short-circuit |
| E8 | Blinking once | Continuous blinking | The temperature of heat exchange abnormal |
| E9 | Blinking once | Continuous blinking | Float SW actions (only with FS) |
| E10 | Off | Continuous blinking | Excess number of remote controller connections |
| E14 | Blinking for three times | Continuous blinking | The communication fault for master/slave indoor units |
| E16 | Blinking once | Continuous blinking | Fan motor abnormal |
| E19 | Blinking once | Continuous blinking | Configuration fault on running checking model |
| E28 | Off | Continuous blinking | Remote controller sensor interrupted |
| Over E30 | Off | Continuous blinking | Outdoor unit checking (outdoor circuit board LED checking) |

# HYPER INVERTER PACKAGED AIR-CONDITIONERS

MITSUBISHI HEAVY INDUSTRIES, LTD.

Air-Conditioning & Refrigeration Systems Headquarters
16-5, 2-chome, Kounan, Minato-ku, Tokyo, 108-8215, Japan
Fax : (03) 6716-5926

Because of our policy of continuous improvement, we reserve the right to make changes in all specifications without notice.

© Copyright MITSUBISHI HEAVY INDUSTRIES, LTD.